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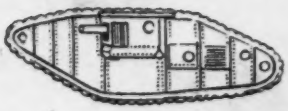

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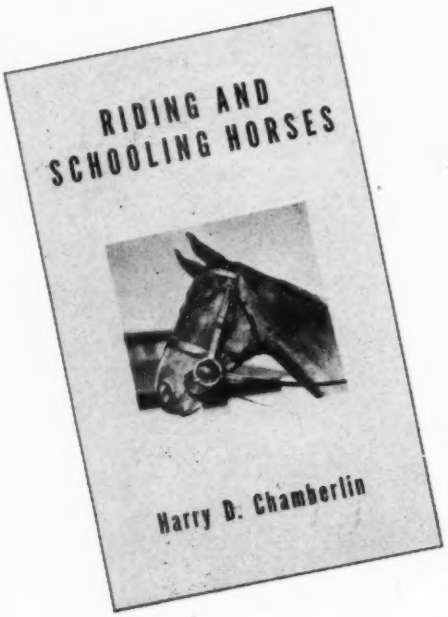

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Armor in the future must fly, contends General Gavin. Presented here are theories and facts that deserve serious study and thought by all military men, but especially those concerned with armor. Forecasts the author, "We must build the weapons, the combat vehicles, and the aircraft, that will permit us to fly our armored divisions. For it is in the air that the future of armored forces is to be found." By the courtesy of the author and the Infantry Journal this article is being published simultaneously in both magazines.

THE FUTURE OF ARMOR*

By Major General James M. Gavin

(Commanding General, 82nd Airborne Division)

ARMOR in the future must fly, just as all other means of war must fly. Possessing good cross-country mobility, and gunned to destroy any earth-bound vehicle, the tank will play the decisive role in the coming battles for the airheads. Armored reconnaissance vehicles will be equally important in a tactical role. The dispersion of future antiairborne defenses and troops, and the critical need for information immediately upon landing, will make armored reconnaissance vehicles invaluable to an airborne attacker. High on the list of any enemy antiairborne defensive equipment will be armor. This was so in World War II and

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will be in the future. Against an airborne landing, widely dispersed units will go into action by locating and isolating the attackers. This can best be done by motorized and armored patrols backed by larger units of armor. To cope with this the airborne force must have vehicles capable of reconnaissance and counter-reconnaissance missions and vehicles mounting weapons that can destroy the enemy's armor. Such airborne armored vehicles are most likely to make the difference between victory and defeat in airborne combat.

Besides armored vehicles themselves, successful airborne combat requires the qualities of mind and combat leadership traditionally attributed to cavalry. Boldness, aggressiveness, flexibility of mind and mental as well as physical courage are all essential to the successful conduct of airborne combat. The tactical stage for the cavalry or armored cavalry of the future will be deep in enemy territory where cavalry is at its best. It must be flown to get there. The strategic and tactical employment of our armored cavalry is clear. It must be flown.

This poses a perplexing problem to our contemporary students and planners of warfare. World War II seems to have proven that it takes a tank to fight a tank. And now that tanks are carrying armor plate from seven to 12 inches thick, weighing from 60 to 100 tons, it will take quite an airplane to lift and fly such iron leviathans to the battlefield. Even to fly a 50-ton tank requires a converted B-36. These cost some $20,000,000 apiece, and there aren't more than three airfields in the U. S. at the present time where a B-36 can land.

It is true that we have such planes and we have such tanks but we also have hand-carried antitank weapons of the shaped charge principle that can knock out a foot-thick tank with a single round.

Obviously there is fallacy in reasoning that concludes we must fly 60- to 100-ton tanks in airplanes that do not yet exist in order to win future airhead battles. The matter most certainly deserves further study. My purpose is to consider our present doctrine, analyze historical trends, and arrive at what I believe is a reasonable prediction of the future of airborne armor.

The need to give our armored cavalry wings has been recognized by our leading military analysts for some time. Even the horse has received serious consideration as an airborne possibility. In the July 1946, *Military Review,* Lieutenant Colonel John H. Swenson, instructor at the Command and General Staff School, impressively presents the effect of airborne horse cavalry landed in an enemy rear area. The War Department Equipment (Stilwell) Board Report of May 1946, recommended that the feasibility of converting tanks and armored cars into gliders be investigated. Writing on future war in his new book *Men Against Fire,* Colonel S. L. A. Marshall says: "The only logical strategic corollary of decisive strength in the air arm is the movement by air of all forces which fight on ground—infantry, tanks and artillery—and of the supply necessary to supply them. This logic breaks down only at the point where the question arises whether it is economically possible to develop and maintain an air transport of such capacity. That it would be decisively advantageous is incontestable."

In the Armored Cavalry Journal for March-April 1947, Colonel Hayden A. Sears, Director of Instruction at The Armored School, thoroughly explored the possibility of transporting armor by air, stating in part: "armored divisions are organized primarily for offensive action in hostile rear areas." How true! And where could they find a better place to fight than in an airhead? As Colonel Sears goes on to say, "armor must be mobile if it is to be employed in strategic offensive operations and must possess the mobility of the troops it supports if it is to be employed on limited tactical operations." This too, is fundamental. Armor must have the mobility of the troops it supports, not only their tactical but strategic mobility as well. And troops of great tactical and strategic mobility need armor if they are to exist as a combat entity on a future battlefield. Colonel Sears logically arrives at this conclusion: "Without lift, neither armor nor its supporting troops will remain truly mobile as that term may imply tomorrow. Armor of the future may be forced to be relatively light in weight if the full advantages of available air lift are to be realized. . . . This cannot occur today and might be incapable of accomplishment tomorrow; however, it is a possibility of the future which cannot be overlooked."

This last statement, considered in its application to masses of vehicles is correct, but the fact is that armored vehicles were flown and fought in airborne operations of World War II. The British airborne forces especially designed and constructed the Hamilcar glider to carry the light tank. They used such tanks very effectively as airborne weapons in the Normandy invasion. We ourselves also had a light tank battalion shipped to the United Kingdom for airborne use in the invasion, but the British planned to use all of their available Hamilcars and tugs and our battalion had to be redesignated as a ground unit.

In the 82d Airborne Division, the Division Reconnaissance Troop had jeeps modified with armor-plate protection for driver and crew. These were flown into Normandy on D-day by CG4A gliders and into Holland on September 17, 1944 in the assault echelon. They proved invaluable and performed magnificently on typical cavalry missions.

The problem then is not one of whether armored cavalry can or will be flown. It has been flown. And it will be flown on a much more extensive scale in the future. Armored divisions will fly. They had better fly or we are going to be soundly defeated if we try to win airhead battles with unsupported ground infantry armed only with hand-carried weapons.

The trends of aircraft development and combat technique point clearly to the fact that armored units will be flown by some nation soon. The real problem is, not whether it *can* be done, but *how* it must be done. And the problem is not as tough as it may appear to be,

for the history of warfare contains many parallels to our present problems. A study of combat history and sound deduction from that study will bring the answers into sharp focus.

The battle of weapon versus armor and of mobility opposed to stagnation is as old as history itself. Perhaps the earliest recorded account of a heavily armored and comparatively immobile combatant overcome by agility, mobility, and a good weapon is the Biblical story of David and Goliath. An account of it published recently is found is the best seller, *A Study of History,* by Arnold J. Toynbee: "Before the fatal day on which he challenges the armies of Israel, Goliath has won such triumphant victories with his spear whose staff is like a weaver's beam and whose head weighs 600 shekels of iron, and he has found himself so completely proof against hostile weapons in his panoply of casque and corselet and target and greaves, that he can no longer conceive of any alternative armament; and he believes that in this armament he is invincible. He feels assured that any Israelite who has the hardihood to accept his challenge will likewise be a spearman armed cap-a-pie, and that any such competitor in his own panoply is bound to be his inferior. So hard set is Goliath's mind in these two ideas that, when he sees David running forward to meet him with no armor on his body and nothing in his hand that catches the eye except his staff, Goliath takes umbrage instead of alarm . . . he does not know that David, having realized, quite as clearly as Goliath himself, that in Goliath's accoutrements, he cannot hope to be his match, has therefore rejected the panoply that Saul has pressed upon him. . . . And so this luckless Philistine triceratops stalks pompously to his doom."

The story of David and Goliath has been repeated throughout history. Implicit and unreasoning reliance on the weapons that have won past encounters is suicidal. Though initial success may seem to justify the soldier's great confidence in his weapons, without at least an occasional reappraisal, this confidence turns very soon into a blind ignorance.

This pattern has been the same throughout the history of war. The individual hoplite succumbed to the phalanx, a seemingly invincible mass of manpower that dominated the battlefield until the Roman Legion came. In the Battle of Pydna the Roman Legion with its greater mobility and tactical versatility supplanted the phalanx. The Roman was prideful of his infantry legions and developed them to an unprecedented perfection. They ruled the battlefield for centuries until they met the mailed horseman armed with lance and sword. Mobility and firepower favored the cavalryman and he rose to the top. He, too, was confident and could not imagine nor conceive of a better arm or method. Soon there appeared on the eastern horizon a new kind of horseman. From the steppes of Asia he brought a hardihood and striking power combined with a greater mobility than had ever been seen before. The slow, heavily armed, completely confident Goliath, the mailed horseman, was now opposed by an agile quick-striking David, with hand spear and powerful bow. Later, when armor improved, a new combatant appeared, clothed as usual in heavy armor and a profound belief in his own invincibility—the armored knight. But at Agincourt the British bowmen, unarmored but quick afoot, faced the heaviest armored force then known. So heavy, in fact, that when dismounted through combat they lay as helpless victims to the blow of the first foot soldier who could get to them. Agincourt, and Crecy with the first European use of gunpowder saw the end of the heavily armored knight. They were supplanted by the quick-footed bowmen and, in time, by foot soldiers with firearms.

But man learns slowly and the idea of the invincibility of mass, weight and stability still persists. The story of David and Goliath holds the same lesson for today's soldiers it did for the soldiers of thousands of years ago.

War is a dynamic science, ever changing. The principles stay the same but the means and methods constantly develop. Every change is opposed by many of those who won the last war for they are convinced their way was and still is the best.

The psychological basis for this resistance so vitally affecting the soldier's judgment is the strong inner desire for security in something known. They do not want new weapons because these weapons will not be what they know. It is from this subconscious fear of change that mental resistance and inertia springs. This runs throughout history, too, and perhaps its most important specific manifestation today is the reluctance to see that the heavy tank is done. The race between armor and gun, with the tank constantly growing heavier, already spells doom for the heavy tank.

The place for the heavy tank is in the Smithsonian Institution. The future of armored vehicles lies in lighter, much lighter, equipment. These lightly armored vehicles must mount the most highly penetrative guns available for reasonable ranges, say, 2,000 to 3,000 yards. They must have great cross-country mobility. They must have enough armor to protect the crew from flak, small arms, and air bursts. Magnesiums and silicates must be used for lightness of construction wherever possible. Shaped-charge and recoilless features must be incorporated in the artillery. Such vehicles should not weigh more than four or five tons.

History has still another lesson for us that merits continual examination. Air power is any weapon that can be flown. When armored cavalry flies it is air power —just as much air power as a bomb or missile. The present generation has seen air power in its inception and we are today witnessing the first evidences of its development. The question in the mind of every military student is what line of development will it follow? What will air power be ten years from now? What will the elements of air power be *twenty* years from now? There is again a historical parallel worth the closest scrutiny, the development of sea power.

Man once feared the sea. Beyond the horizon were

eternal flames, boiling waters, and consuming monsters. The brave who ventured to sea met frequent disaster because of storms, frail craft, and loss of direction. Those who survived were the heroes of their time. And when Phoenician sailors finally ventured beyond the Pillars of Hercules, they were the greatest heroes of the known world because they had conquered that awesome substance which covered so much of the earth. Despite the early hazards man soon learned to master the sea and turn it to his military advantage. The Persian King Darius launched the first big amphibious operation across the Hellespont in the sixth century before Christ. His son, Xerxes, brought amphibious operations to a high state of proficiency. They were followed by the Greeks and Romans, each improving on the means and methods of their predecessors. But it took until 1944 for man to reach full realization of the possibilities of the sea in war. That year in the Allied invasion of Normandy man employed thousands of seacraft of a multitude of types, each designed and built for a special purpose. There were some that travelled over both land and sea, there were shallow draft and deep draft vessels, infantry carriers, tank carriers, mine sweepers, rocket vessels, missiles—every type of vessel it took to bring the full weight of sea power to bear on the enemy at the decisive place and hour.

It will take no less of air power if man is to carry into combat the means he will need to overcome a well organized defender.

Legend and folklore have passed down to us an account of an amphibious war that contained a situation strikingly like the one confronting us today. It is from the Roman-Carthaginian War. Carthage, great maritime nation and commercial rival of Rome, sent its ablest general, Hannibal, through Spain and across the Alps with, among other things, a herd of elephants. His mission was to defeat the Romans and cause the surrender to Carthage of the Roman nation. He met with many successes, ultimately moving with freedom from one end of the Italian boot to the other, though he did not succeed in capturing the city of Rome, nor in overcoming the will of the Roman people to resist. After several years of fighting the Romans decided Hannibal could be beaten and forced to withdraw if the Carthaginian fleet was defeated and Hannibal cut off from his homeland. To do this required several innovations in the use of sea power. The Romans built up their galleys with several banks of oars to obtain greater mobility. Then on the top deck they placed their fighters, in position to deliver the full weight of their power against any adversary with whom they could close. This striking combination of mobility and fire and its method of combined employment was as radical in its day as the P-80 is now.

Meanwhile, the Carthaginians confident of their invincibility awaited the onslaught. Had they not routed the Romans for the past 10 years? The elephants had proven a decisive factor and the Carthaginians had an unlimited supply of them. The problem for the Carthaginian General Staff was merely one of building boats big and strong enough to get the elephants to where they could fight Romans. Meanwhile the Romans went on with their increase of fire power and mobility of seacraft. Soon they had enough to meet the Carthaginians at sea on what they considered reasonably good terms. But the Carthaginians were having trouble. What were they doing? Trying to build boats around the elephants. An elephant is not a seafaring animal; in fact he hates the sea. He wasn't built to go to sea. His bulk is a mass of concentrated weight existing in constant defiance of gravity. Getting a boat around him, and building enough boats to get enough elephants out to sea, was still an unsolved problem when the fatal day came. The Carthaginians suffered the most decisive defeat at sea in their history, which began the national decline that ended in annihilation.

But with their passing they left us a lesson—the lesson that seems so impossible to learn. The fine ground armies that won the last war are not good enough to win the next. If a new means of transport can give them greater mobility and bring to the battlefield greater fire power, it must be exploited. There lie the combat victories of the future, not in remembering too thoroughly how the last war was won. And if, in exploiting this medium, new types of craft, and new types of weapons and combat weapons and combat vehicles, must be built, then let us build them as soon as we possibly can.

We must build the weapons, the combat vehicles, and the aircraft, that will permit us to fly our armored divisions. For it is in the air that the future of armored forces is to be found.

There will be heavy opposition to such a program. Our designers claim that our automotive production potential is our greatest defensive asset and the product it delivers to the American market is a heavy vehicle. There is no place in the American automotive business for a plastic, silicate, magnesium, soybean automobile, and they have no interest in helping the army develop such a vehicle. Well there is no market, either, for 81mm mortars, or 155mm rifles, or P-80s, but we developed them, and we will have other combat requirements in the future that have no civilian counterparts. We had better build such vehicles or we will be left with the finest civilian luxuries in the world and no means of protecting them.

Whether we describe it as the Four Freedoms or as simply, as a British statesman did last year, being able to go down to the railroad station "and get a ticket to go where in the hell we please," our way of life is at stake and the competition in which we are now engaged is a keen one. Either we show foresight now and develop the means that will enable us to fly everything we need for combat or another nation will. If another does, well, we've had it.

Criticism of such a program will be by those who will show statistically that we cannot build enough airplanes to provide all of the bombers, fighters, and reconnais-

sance planes we need, let alone troop-carrier transports in the numbers this program contemplates. My answer is that we had better build the aircraft necessary to get troops about strategically and tactically or we will not have bases from which to operate our other combat craft.

But we must stop building *one* converted B-36 to fly *one* Sherman tank. Our troop carrier aircraft program must be based upon planes especially built for the purposes intended. It is most uneconomical to plan on a completely new craft for every combat load. Troop carrier airplanes should be built so that the engines and flight control surfaces can be used to fly many different types of detachable payloads. For this we could make a maximum use of available craft and at the same time protect them from the hazards of long exposure in forward areas.

Finally, there will still be those who say it takes a tank to fight a tank, and that we found this out when we embarked on a very ambitious tank destroyer program in 1942. It won't be easy for a thin-skinned combat vehicle, mounting however good a gun, to move about future battlefields against conventional heavy armor. It may be that the type of tank I have recommended has greater tactical defensive qualities than offensive despite its great strategic offensive characteristics, but I believe we can develop its offensive qualities. Certainly we must have it if for no other reason than its strategic and tactical defensive merits. To say that it cannot be any good because we already have the best there is in offensive heavy armor (armor, remember, that anticipates going to the 100-ton class to protect itself from existing guns), is simply setting up to be another Goliath.

This much is clear from the lessons of history. We must develop light armored vehicles. We must develop air-transportable lightweight antitank guns for use on our armored vehicles and on the ground. We must develop light armored reconnaissance vehicles. We must lighten all items of combat equipment used by the armored forces, and their signal, medical, quartermaster, ordnance, and other services. And finally we must develop and produce aircraft suitable for the peculiar requirements of future airborne combat. This last requirement means track-laying, detachable fuselages, and 10-ton payload aircraft of an operational radius of 1,000 miles that can land in practically any area that is cleared of trees, poles, fences, and similar obstructions.

Only when we learn these lessons and apply them will the armored cavalry again have regained its traditional combat role. Striking at high speed by air, and entering ground combat that requires mobility and the retention of the initiative until the decision is gained, the armored cavalry will play the decisive role in future airborne combat. It is in airborne combat that the future of armor lies.

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GUERRILLA WARFARE

*by Captain Edwin M. Rhoads**

IN time of peace prepare for war—these words were never so true as now. We must plan for adequate defense against all eventualities. Undoubtedly the atomic bomb and the defense against it is one of the most important problems we have to face today, but we must not let this one weapon overshadow other phases of the security of our nation. America is the most dominant country in the world today, eyed jealously by lesser and poorer nations. Unless we start World War III, an action foreign to our way of living, we are almost certain to be invaded, with or without a prior A-bomb attack.

The formula for invasion of a country is well known: fifth-column activity, crippling of industry and transportation by long-range bombing, break-up of troop concentrations, movements and defensive activities by aerial attack, and beachhead. It worked in Africa, the Pacific, and Normandy, why shouldn't it work in New Jersey, California, Canada, Mexico or Alaska? The answer is, that it will work for any power having air, sea, supply, and fire superiority, and we have no way in the world to prevent any country getting the jump on us. We cannot maintain the world's most powerful fighting machine. Such a procedure is economically unsound, since an army costs money, even when it is winning a war. In the past 50 years, other countries have taken the first two strikes while we warmed up for the home run, but next time we'll be up to bat first. What, then, is the answer? Much as we dislike the thought, WE MUST BE PREPARED TO TRADE SPACE FOR TIME. Once such a policy is begun, the patriotic spirit of the people helps keep it rolling, as in Russia and China during this past war. Years ago a general did the same thing with the help of a handful of riflemen, and as a result the United States emerged from a piece of paper to a reality.

The resistance carried on to prevent the too rapid advance of an invading army while we are mobilizing our armed forces and industry will follow certain characteristics. Due to paralyzed transportation and widespread areas of invasion, resistance operations will involve many small, independent units rather than large well coordinated forces. Operating with hit-and-run tactics, these units will have to be self-sufficient, utilizing local food supplies, civilian transportation, including cars, trucks, light planes and horses, civilian weapons and ammunition (or government-issued home defense supplies), and will have to improvise equipment not otherwise available. This is nothing more or less than guerrilla warfare. Other names may be more descriptive or appropriate, but for the sake of simplicity, the term will be used throughout this article.

One needs only to glance at the pages of history to realize the extent and effectiveness of guerrilla warfare in the past and present day. Alexander the Great, Caesar, and Napoleon each encountered guerrilla resistance, and each was forced to acknowledge the effectiveness of these fighters. George Washington's first line of defense consisted of scattered groups of backwoods riflemen, which bore the brunt of war until his army could be assembled and equipped. In our expansion of the West, the Indians waged the bitterest guerrilla campaigns against the invasion of their lands, and were defeated only when our troops adopted the same type of tactics. A lifetime may be spent in the study of the guerrilla wars of history.

Modern guerrilla warfare was conceived by a man who was not a soldier but an archeologist, Lawrence of Arabia. Up to his time guerrilla campaigns had been of a tactical nature. Success or failure of their operations were usually not decisive in effect. Lawrence utilized his guerrilla army strategically by protecting the flank of General Allenby's forces in the latter's spectacular World War I campaign. Since then most successful guerrilla operations have been coordinated with organized military forces. A few examples in the recent war are the Russian partisans, the French Maquis, the heroic Filipinos, and the Yugoslavs under Tito and Mihailovitch.

We can prepare for a guerrilla campaign by the most economical of all measures, the school system. The British included guerrilla tactics in their Home Guard Training, and we might well follow their example by setting up a school to train army and National Guard officers as instructors for national guard and civilian components. In time of war individuals and small units trained in guerrilla figthing would be available all over the country to organize resistance in the invaded areas. By being a part of the national defense plan, this guerrilla resistance would be coordinated with the action of the armed forces, a vital necessity if the efforts and sacrifices of the "minutemen" of the next war are not to be in vain.

Our country is the choice plum of World War III. Every possible means must be considered in our national security if we would keep our people and our nation from a fate worse than total annihilation. Guerrilla warfare has proven itself an effective means of staving off defeat until the armed forces and industry can get back in the scrap to drive the invaders into the sea.

*ROTC instructor in Denver, Colo., high schools.

A MUST—

UNIVERSAL MILITARY

by Colonel Henry E. Gardiner★

An experienced combat officer looks at Universal Military Training in this article. He draws the conclusion that it is necessary insurance against another war. His arguments are well taken and worth considering.

UNCLE SAM is now busy studying the fine print on an insurance policy he is being urged to take out to cover his family. It is a health, accident and life policy in that internationally known mutual company which has its home office in Washington, D. C.

Twice in 25 years he has been victimized during two major crime waves. When the last one of these was crushed, Uncle Sam thought he was in for a period of peace and quiet and laid off most of his police force. Recent developments indicate that this action was premature and he is now seriously worried about reports of possible new underworld activity. If a mob should decide to move in it might be more than the present constabulary could handle.

This insurance policy Uncle Sam is considering doesn't guarantee his property from being trespassed upon. It would, however, materially reduce that probability and it does assure an easier job of throwing out any intruders if they force their way in.

The old gentleman has, of course, been an unusually economy-minded person lately. Even so, the annual premium rate doesn't seem high to him, particularly when compared to what he has had to pay for some short term insurance a few years ago.

This policy is offered under the name of "A Program for National Security" (Compton Commission Report). The complete program consists of the following six elements: 1. A strong, healthy, educated population; 2. A coordinated intelligence service; 3. Scientific research and development; 4. Industrial preparedness; 5. Balanced armed forces (Army, Navy, Air Force and their civilian components); and 6. Universal Military Training including civilian defense. As one of those whom Uncle Sam called upon to help him put down the last crime wave, I am in favor of such insurance. This article will deal exclusively with one part of the six-point program—Universal Military Training.

During last August, I went to Fort Knox, along with a group of other reserve officers, to take a look at the Universal Military Training Experimental Unit that the Army has been operating there since January of 1947. This visit to Fort Knox was actually in the nature of an attendance at a course designed to show what the Army is doing in anticipation that it may be called upon to carry out a program of universal military training. A series of these courses were given to reserve officers throughout the late summer and early fall.

This unit at Fort Knox was not activated for the purpose of selling universal military training to the country. It was set up on the other hand as a sort of pilot model to test the program that the Department of the Army had prepared. Any bugs that were located were to be corrected and the whole plan perfected for adoption on U-Day, if Congress gives the green light.

The National Training Program would be the same as is being given to the Unit at Knox. The first eight weeks are devoted to basic training, the next 11 weeks to branch training and the final three weeks to unit training.

As now set up, the battalion of trainees consists of four composite companies. During the branch training, instruction is given at the platoon level in each of the arms and services. There are three platoons of Infantry, two of Artillery, one of Antiaircraft, two of Armor and one each of the Engineers and the other Services.

The companies, which consist of 160 trainees, have a cadre strength of six officers and 19 enlisted men to

★Reserve Officer and former Tank Battalion Commander in the 1st Armored Division.

RTRAINING

handle the training and administration. Once UMT were in full swing, it would require a cadre of 80,000 men and officers to operate it. This training would be carried on in units up to the size of a division at 21 camps throughout the country which were used during the war.

So far as the military part of training is concerned, the Experimental Unit is trying few innovations since it is believed that the methods developed during the war years have proved their adequacy. Bayonet instruction and dirty fighting methods, however, have been eliminated, it being felt that they have no value during peacetime training.

Under the proposed program, the Umtees would not be in the Army nor governed by the Articles of War but rather civilians under military control for training.

They would be operating under a Code of Conduct such as the trainees in the Experimental Unit are now. This method provides for giving demerits for minor delinquencies similar to that used at West Point and in Officer Candidates Schools. After a trainee accumulates five demerits in one week, he has to work them off at the rate of one hour of extra fatigue duty for each demerit in excess of five, and this may also mean the loss of a week-end pass. As a reward for being "on the ball" at the end of each month, the three trainees in each company with the fewest demerits receive three-day passes and a letter of commendation from the commanding general.

When a man is charged with a minor offense, too serious to be handled by the demerit system, he is tried before a trainee court made up from trainees of another company. The court is organized and operates much the same as a special court-martial, although, in effect, it is just a means of handling company punishment. The court determines the guilt or innocence of the accused and then his company commander, who presides over the court, fixes the punishment, if any is to be given.

Profanity and obscenity are prohibited for both the cadre and the trainees. That, of course, is a major departure from what most of us used to consider a perfectly normal, if not necessary, way of doing business. Strangely enough, it seems to work, although it is doubtful if such a reform could have gotten far, regardless of the penalties, before the days of mechanization.

The approach to sex morality is not the old familiar one where the emphasis was on how to look after yourself but rather one of continence.

In the Experimental Unit, the Chaplain plays a very important role. He, in addition to his spiritual duties, has an important part in the training program where he instructs on the subjects of citizenship and morality. During the first four weeks of training, the Umtees are confined to the area and they have the choice on Sundays of attending Church or going to a lecture on morals. Only one man so far has preferred to listen to the talk on morals. When Church attendance becomes optional, simultaneous with the issuance of week-end passes, most of those remaining in camp, including cadremen, continue to go to Church.

Strong emphasis is placed on the off-duty program and ample facilities are made available. During the first cycle, nearly 50 per cent of the trainees participated in the off-duty educational program and some completed graduation from high school by this means.

The duty week is 44 hours, which includes 4 hours of Saturday morning instruction in courses other than military, such as auto mechanics and typing (the two most popular courses), bookkeeping, psychology, radio, concert band, glee club, drum and bugle corps, photography, gem cutting, plastics, metalcraft, woodwork, model airplanes, leathercraft, woodcarving, Spanish, German, shorthand, a course in athletic instructing, history, mathematics and English.

Athletic competition is at the platoon level, thus engaging the greatest number of men. Every man must learn to play at least one game. Much of the instruction is given on duty time, as part of the training, and by squads. All trainees are taught how to swim.

A lot of emphasis is given to raising the general tone and the cultural level of the Unit. No beer is sold at the PX, it having more the atmosphere of a corner drug store than a bar. Observance of fundamental dining room manners is required. Men are told how to behave in public or in a private home and are given an opportunity to learn how to dance. They are also taught the fundamentals of common courtesy, as well as military courtesy.

You say that this doesn't sound like the Army you used to know. Well, it isn't in many respects and where it isn't the change has certainly been for the better and at no loss of military effectiveness.

While many people have visited the UMT Unit at Knox since it was first established, it is too bad that more people can't see it and, particularly, those who oppose the enactment of the legislation that would be necessary to change this pilot model over to a full-sized production plant. It is really an eye opener and once you have watched it operating you just can't help but be 100 per cent for the program.

Some of the more widely circulated articles on the UMT Experimental Unit have given a very distorted and misleading picture of this project. The only artificiality about the present setup is that, of necessity, the men in the unit are enlisted men as against, in the future, being Umtees or whatever they may eventually be known as. They are, however, of an average of 17½ years of age, the plan being to give this initial six

months' period of training to a man after his eighteenth birthday. The training that is being given is primarily military and there is no coddling or pampering of the trainees as has been inferred.

Under the Department of the Army's plan, there will first be a six months' intensive training in camp. This is the phase of the UMT that is being experimented with at Fort Knox today. The unit consists of a battalion of 664 trainees. Originally, it was planned to only operate the unit for one period of six months. Subsequently, however, it was decided to continue on another six months with another group. Whether a third group is to be put through this course is unknown at the time this is being written.

On completion of the first six months' training, the UMT has several elections for working off the remainder of his special training. He may remain in camp under Army, Navy or Air Force jurisdiction and take an additional six months' training. He may enlist in the National Guard or he can enlist in the Reserve Corps for six years, subject to six months' additional active duty training in this period at not more than 30 days a year. He, of course, could also join the regular Army, Navy or Air Force. Other options that a trainee may accept after the completion of the first six months' training are: Enlist in the Enlisted Reserve Corps, enter a college or university that includes a course in ROTC. Under this option the trainee agrees to accept a reserve commission if offered at the completion of the course; enlist in the Enlisted Reserve Corps and pursue a specialist or technical course approved by the Department of the Army in a trade or vocational school, or a college or university.

As everyone knows, the Army today is fighting a losing battle to maintain its authorized strength of just over a million men through voluntary enlistments. However, an all-time record has been achieved since we now have the largest volunteer army in history. The National Guard, despite every promotional effort, has not been able to secure the number of recruits it needs, and the enlisted Organized Reserve is far below any really effective strength. That this is a truly serious situation is all too self-evident.

The average American is not interested in the Army as a career or on a part-time basis. Furthermore, most of those who were with the armed services during the last war got such a bellyful during their tour of duty that, despite the continued need for their services, they aren't interested in voluntarily keeping up that kind of activity even on a peacetime basis.

There has been only one practical solution advanced to fill up the Army and the National Guard to their proper strengths and to create a reserve which will truly amount to something. That solution is the enactment, as has been requested by the President, of the Universal Military Training Bill now pending in Congress.

The enactment of the Universal Military Training Bill would provide the same impetus to enlistments in the Army that the Selective Service Act did while it was in existence. Not only would it enable the National Guard and the Organized Reserve Corps to maintain their M-Day strengths by funneling into them a continuous flow of trained men, but it would be supplying recruits who would have had one thousand hours of basic training. Anyone who has labored to instruct recruits in the National Guard in their preliminary training on the piecemeal basis of one two-hour drill period a week knows what a tremendous difference that would be. The result would be a raising of the training level of the Guard and the Reserve to a point that, under normal conditions would not be reached for five years.

Approximately 1,000,000 men of those reaching an age of eighteen each year will be physically fit to participate in this program; out of that number, it is estimated that 150,000 would enlist in the Armed Services. Of the balance, 50 per cent would be trained for the Army, 30 per cent for the Navy and 20 per cent for the Air Forces.

With the regular services and the National Guard at their full strength and the Organized Reserve building up at the rate of a million trained men each year, any potential aggressor would think more than twice before taking a crack at us. They might even get over their present habit of walking around with an incident on their shoulder.

If UMT does not prevent another war, it will certainly do as much as can be done in advance of hostilities of insuring that we will win. This country could have turned the tide of the last conflict long before it did if it had had the trained manpower reserve that UMT will provide.

After completing their military obligation under the Universal Military Training Program, UMT graduates will be a valuable asset to all civilian defense programs.

We are daily reminded of the cost of this last war by the return of those bodies that are being brought back home for final burial. While you can't fight a war without having people killed, you sometimes have needless casualties. Most of these come through inexperience and lack of training. This lack of experience and training is, of course, even more dangerous to the troops when it occurs as it often did in the various echelons of command. Altogether too many men were killed who might be alive today had they been more thoroughly trained and not rushed up to fill the call for replacements before they knew their jobs.

When the front-line units are clamoring for replacements, they get what is available. If it happens to be a group of men who may have been in for only a few months and yet haven't learned all the fundamentals of soldiering and haven't become thoroughly acquainted with their weapons, they go up anyway. Men aren't kept in replacement depots for further training when they are needed at the front. During wartime you never have sufficient time to thoroughly train or prepare.

In a country which is so accident-fire-cancer prevention conscious, it is difficult to understand why there isn't more of an awareness of the advantages of taking

out some preventive measure against war and needless casualties.

The opposition to UMT seems to come primarily from the parents of those whose sons would be affected, the educators, various religious groups and the labor unions. So far as the latter group is concerned, they seem to be agreeable only to their own particular type of regimentation.

Many parents; church leaders and educators, who have gone to visit the Experimental Unit admittedly opposed to the proposition that compulsory military training was desirable or necessary, have changed their minds and left saying that they hoped that the enabling legislation would be passed so that their sons and the young men of the country could participate in such a plan.

The interesting thing is that they were sold as much on the benefits that it would have for the individual as they were on what it would do in increasing the country's military potential.

Twice in modern times this country has suffered the tragic and stupendous cost in lives and money that comes from unpreparedness. In each case, there proved to be time to overcome our failure to be ready and we were able to build up our strength while our Allies battled the enemy until we could throw our full weight into the conflict and defeat the powers that had forced a war upon us.

The signs are irrefutable that there will be no such opportunity again. We are the Number One target of any major aggressor today. Unless we make ourselves strong enough to defend this country and capable of striking back with effective force at anyone who dares to attack us, we haven't much time left to continue to debate the American way of life.

New Regular Cavalry Officers

Forty Cavalry officers were given commissions in the Regular Army in October, 1947, integration program appointments. These were the last appointments to be given under the program.

Following is a list of those appointed:

Majors:

Lyman D. Bothwell
John L. Lee

Captains:

John H. Huckins
James W. Pumpelly
James R. Dorman, Jr.
Edwin L. Beauchamp
Elbridge L. Brubaker
Donald A. Sanders
William F. Jackson
Ralph W. Contrum
Raymond B. Steiner
Roy Lassetter, Jr.
Julian P. Fox, Jr.
Barry F. Phillips
John B. Routh

First Lieutenants:

Francis Daugherty
Charles W. Calvert
Frank R. Pagnotta
Thomas S. Jones
Ernest Von Pawel
Elmer B. Lagerman
R. J. MacEachen
Leo J. Nawn
Walter J. Davies
Harold H. Dyke, Jr.
John T. Eichnor
John M. Wright
Gerald G. Coady
Robert E. Miller
William E. Potts
William C. Dysinger
Neil M. Chapin
George H. Gould

Second Lieutenants:

Clinton E. Hearn
Clark O. Irving
John H. McAuliffe
Charles C. Ross
Stanley A. Durka
Marshall D. McClure

VISUAL EDUCATION IN ARMY INSTRUCTION

*by Major James W. Cocke**

As defined by the author, "A visual aid is any especially prepared device designed to facilitate learning through an appeal to the sense of sight." And this is one of the most thorough and best articles on Visual Education that the Armored Cavalry Journal has ever presented to its readers. This article will be of value to anyone engaged in teaching either in or out of the Army.

WHAT is the principal task of the military instructor? I believe that the principal task of the military instructor is to present his subject in such a way that it will convey thought, arouse feeling or interest, and create or provoke action of the mind. All of these tasks lead to one ultimate objective, "Victory in the event of war."

Despite the fact that instruction is one of the principal duties of every officer and noncommissioned officer in the army there is still far too little use being made of the visual sense in everyday teaching assignments. Harold Benjamin says, "Education is a most important human agency, which, by its very nature, requires thorough understanding and utilization of all means of communication. It is often the last to employ new and improved methods for the transmission of thought." Every day we in the army see instructors droning forth their daily lessons of facts and theories from memory or merely from notes in complete disregard of economy of time and effort in accomplishing the mission. While good military instructors have for many years recognized the importance of visual aids as a means of motivating and vitalizing teaching and learning, observation of the work of many officer instructors has convinced the writer that the average officer fails to make adequate use of visual aids at his command—to say nothing of those simple illustrations which could be prepared with little effort or imagination.

In this scientific age of atomic warfare, speedy communications systems, jet propulsion, and other modern developments are making unprecedented demands upon the military instructor, hence, he must employ teaching methods which are logical, reasonable and desirable. As we delve into the field of methods of instruction, we become concerned with the problem: how can I, the instructor, accomplish my teaching mission most efficiently and in the shortest possible time? In order to accomplish this teaching mission we must use direct methods of approach and supplement that approach by appropriate aids to instruction. In addition we must analyze the problem from the standpoint of the student and the instructor. Your success as an instructor will depend largely upon your understanding of the student and the way he learns. It behooves every officer to become a student of human behavior and of the psychology of learning. Becoming a good instructor is the first step toward successful leadership.

*Chairman, Methods of Instruction Committee, The Ground General School.

History of Visual Aids

According to McKowan and Roberts, and certainly our own knowledge of history will tell us, that primitive man learned enough to convey his thoughts by signs, gestures, facial expressions and crude imitations long before he developed a vocabulary with which to express himself orally. Primitive youth was probably taught to protect himself, to hunt and construct shelter by observing and imitating other members of the tribe. This was the demonstration method or appeal to the student through the sense of sight; and, finally, the application stage of instruction in which the student "learned by doing" the things he had been taught. This developed through the years until blackboards, charts, books, photographs, and simple illustrations came into use. "Visual education" as we know it today, consists mainly of materials or objects which are used in classroom or in teaching situations to facilitate the understanding of the written or spoken word. The army has placed a great deal of importance on visual education in recent years and has devoted a full chapter in TM 21-250 to their use and also prepared FM 21-8, "Training Aids," which lists all aids which have been prepared and are available for use in War Department stocks.

What Is A Visual Aid?

A visual aid is any especially prepared device designed to facilitate learning through an appeal to the sense of sight. The aid is usually of such nature and size that it can be used in carrying on group instruction —that is, large enough to be visible to the entire class. Text materials, reference books, and other printed matter make use of the visual sense; but, since these are not considered as being especially prepared devices that can be used before an entire class, I shall not consider them here. This discussion pertains only to devices which can be used before an entire class.

The instructor must take into consideration, that the backgrounds of our soldiers are as varied as the communities from which they come. Therefore, no instructor should take for granted that all students will learn equally well. In the first place, all learning is based primarily upon the sensory experience. As students of human behavior and of the psychology of learning we must realize that our concepts of various relationships are in terms of meanings applied to our various sensory experiences. The only way that you, the instructor, can reach and influence the student's mind is through the five physical senses. According to psychologists, there is no "secret back door" by which you can "sneak in" a little knowledge. In order for us to obtain a clearer concept of the realm of visual aids, let us review the five senses. They are: Sight, Hearing, Touch, Smell and Taste.

I like to think of these senses as the five highways to intellect because along these highways all knowledge travels on its way to the focal area of the mind and finally into the vast reservoir of knowledge (the marginal area) where it is stored for future use. The intellect, memory and imagination are limited to the experiences and sensations which we have acquired through the physical senses. Cicero who lived in 44 B.C. thought the sense of sight was the keenest of our senses. Most educators agree today that a greater amount of learning is acquired through the sense of sight. In fact some say as much as 50 to 85 per cent of knowledge is gained through the visual sense. Do not confuse this statement with another theory that students "learn most by doing." This axiom refers to a stage of instruction known as the applicatory phase, while my first statement refers to a supplementary method of doing the job.

If the sense of sight is so important, let us study the construction of the eye and analyze the matter a little further. The back of the eye consists of a network of nerves which gather and convey information to the brain. The appeal to the brain through the eyes is much more significant than the appeal to the brain through the ears. The eye can be compared to a high grade camera. It records countless impressions or pictures. Some sales organizations, including the largest in America today, make every effort to appeal to the customer's ear through speech, but they usually attempt to accompany that appeal with an equally strong appeal to the eye. In other words, they try to "picture the idea," or "show a picture."

If we utilize visual aids in our instruction and appeal to the student through the sense of sight, we will probably make a stronger impression on his mind than by merely talking to him.

There is an old Chinese proverb which says, "a picture is equal to 10,000 words." From your own experience, recall how difficult it was to attempt to explain or describe the operation of working parts of a machine gun to a student who had never seen a machine gun merely by appealing to him through the sense of hearing. On the other hand, if the instructor had a working model showing the operating parts of the gun and provided the student with a machine gun so that he could follow the explanation manually wasn't the job much more simple? I think it was.

No verbal description will equal the effectiveness of a good picture as a means of creating visual imagery. We must make every effort to "show a picture" because certain students will form erroneous ideas, as to our true meaning if we merely present ideas verbally.

Much depends upon past experience and particularly the student's ability to see a mental image of what you are talking about. If we show him a picture of the object and how it works, our chances of creating a distorted impression will be reduced by 50 per cent. Not only are visual aids important in establishing a vivid and accurate picture, but they assist the instructor immeasurably in arousing interest, as well as focusing attention upon the desired relationships being studied. Everyone of us, whether aware of it or not, has ex-

perienced illusions of the senses. Our senses do not always tell us the truth. The eye and the ear deceive us, even the hand that we instinctively extend to test the evidence of our senses, has often played us false. It is the belief of many that it is really the mind that is at fault and not the senses. The eye merely communicates the thing it sees to the mind. Through association with past experiences the mind is able to draw conclusions and make decisions. By definition, based upon those experiences, a visual aid is a specially prepared device which is intended to focus the student's attention on the subject or object being studied for the purpose of imparting knowledge through the sense of sight.

One word of caution here! The act of simply providing a picture cannot be separated completely from explaining or describing it and, by this I mean that showing a picture does not necessarily accomplish the same purpose as a proper use of it would. We must describe the aid and show its relationship to the lesson. Assume that I showed you some strange weapon, or device; permitting you to view it for a few minutes without adding a verbal description or telling you how it works, or its limitations, uses or capabilities; likewise, assume that as soon as I had shown it to you, I dismissed the class. Would you consider this procedure sufficient for a complete understanding of the weapon? I don't believe you would. Remember! The average soldier probably doesn't have the benefit of as much extensive training and experience as you have had. We should use visual aids to appeal to the sense of sight; and we should use the voice to explain the aid and its relationship to the lesson.

A visual aid should be used only when it will assist the teacher in the furtherance of learning. If the aid is displayed before it is required for use, the students are prone to concentrate their attention on the chart or model or diagram rather than upon what the teacher is saying or doing. The aid should remain covered or out of view of the class until the point is reached in the lesson at which it will reinforce certain points being taught by the instructor.

Use of Color In Visual Aids

W. H. Hepner, advertising authority, brings out the fact that advertisers have learned that colors and labels on cartons should be especially appropriate to the food contained in the package. Information to be presented in chart form by the instructor should also be packaged according to the character of the material to be presented. Bright colors are used by advertisers to catch the eye. The advertiser wants to attract your attention for a few seconds in order to deliver a mental picture of his product and he hopes to keep your attention long enough to read a few words describing the product and its merits. The use of color in visual aids can be just as valuable as an attention getter. In addition, you the instructor, can direct the attention of the class to the important points of the aid and explain and describe your product verbally to the class.

Bright colors are effective but they tend to hold attention only for a few brief minutes. Contrast is closely associated with bright colors and will be most valuable to you in constructing visual aids. Black on white is one of the oldest and most reliable contrasts. Other combinations used to effect are blue on yellow or red on green. Advertisers exert little effort to make color combinations pleasing to the eye. Instead, they rely on contrast and brightness of color since the real objective is to attract attention.

Have you noticed the increased use of color in our newspapers, films, and magazines today? Why do you suppose this has taken place? The reason is that color makes a stronger appeal to the eye. In construction of visual aids, consider that contrast of color or combinations of colors will increase the effect of your aid as an attention getter.

Purpose of Visual Aids

Visual aids are not considered here as methods or techniques of teaching, in themselves but as devices that can be employed effectively while presenting instruction by any of the usual methods. Among the important uses of visual aids are the following:

a. They broaden the sensory experiences of the learner. This type of teaching device provides the student with additional experience and increases his knowledge of the subject.
b. They strengthen vital images and important sensory impressions involved in learning will become stronger.
c. They offer experiences not possible to receive in the shop or classroom. The student may acquire information through the use of films, models, charts, and maps that otherwise would be impossible.
d. They add variety to student activities. The use of visual aids helps in developing interest and eliminating monotony in the classroom.
e. They develop interest in some specific subject or activity. A film, slide, model or chart may be used to arouse interest in a subject and place the students in a state of readiness to learn.
f. They reinforce learning. Instructional units already taught may be reinforced through the use of visual aids.
g. They develop an understanding of the subject in the shortest possible time. The time necessary for students to learn a subject may be decreased by supplementing either method with effective visual aids.
h. They assist the slower student in learning. The visual aid may remain before the student or may be referred to until he has mastered the subject. Spoken words fade away.
i. They are aids to other methods of instruction. Visual aids do not replace other teaching methods,

but usually make them more effective. A visual aid is not to be used as a separate method of instruction.

j. They show relationships between lessons, subjects, and other learning activities. Films and other visual aids may be used to tie lessons or subjects together and to give them unity. This assists the student to use past experiences in new situations which is an essential function to learning.

Characteristics of Good Visual Aids

In planning, selecting or evaluating a visual aid, consideration should be given to the factors that make it valuable as a teaching device. The following are characteristics of good visual aids:

a. The aid should be large enough to be seen by the entire class. Every student in the room should be able to see all parts of it from his location. A visual aid is of little value if the students do not see it.

b. The important parts stand out. This is often done by using colors, cross-hatching or shading.

c. Only the essentials are included. All unnecessary details are eliminated. They are both worthless and confusing.

d. A visual aid is used for some specific instructional purpose. It should not be used to fill in time or to entertain students.

e. All lettering and notes stand out. Use plain letters that can be read from the rear of the room. A visual aid is not the place for elaborate lettering or for decorative work. Two-inch letters are considered minimum.

f. The vocabulary used in the notes is within the range of the student's understanding. The knowledge to be imparted must not be obscured by words that the average student does not understand.

g. It is portable, easily moved or transported. An aid may be used for several years. It is often moved from one room to another.

h. It is displayed before the class only when needed. All such devices distract attention if they are shown before needed. They should either be covered or removed when not in use.

i. It is made to scale. Models or other aids which are not in proper proportion, tend to confuse the learner and give him false impressions of the true object.

j. It is durable and strongly constructed. Most aids are used for a long time. They must be well constructed in order to withstand such use.

k. It conforms to accepted technical practices in the field. All technical instruction must keep pace with developments in the field. The efficient instructor keeps abreast of the technical improvements in his subject, and is familiar with effective instructional techniques and devices.

Types of Visual Aids

The first and best aid, in most instances (although it is not an "Especially prepared device") is the actual object of the training or instruction being given. All other forms of visual aids may be said to be substitutes for, or supplemental to, its use. Many other visual aids, however, used in combination with or entirely independent of the actual object, will frequently speed the student's understanding. There are many cases, however, in which visual aids are not entirely applicable. Therefore, a very careful study must be made by the instructor to determine whether or not this situation will apply. The mere fact that they are used is no guarantee that learning will be improved. A study of each teaching situation must be made before selecting visual aids, because there are some subjects which do not lend themselves to visual representation.

Models.—In using models, which will in most cases speed understanding, you may find that it is possible to reduce the principles involved to their simplest possible form, and still bring them within the realm of the student's previous field of knowledge. Scale models are more complex and may be used to advantage for certain types of ordnance training.

Charts and Posters.—Charts and posters are often used to present in miniature or in magnification the essential elements of a situation or of an object. In addition, charts help to present ideas and concepts. Posters are an excellent means for emphasizing outstanding points in previous instruction. They are great reminders. The chart and the poster differ in that the chart is intended to present several ideas whereas the poster is intended to present a single idea.

Synthetic Devices may often be used as substitutes for actual objects in certain phases of applicatory training. An excellent example of this is the sighting device which assists the soldier to learn the correct sight picture.

Maps, Photographs and Mosaics have widespread uses in military training.

In addition to the above-mentioned aids, there are a number of more general training aids which are not peculiar to any subject, but which may be used to implement its teaching. In this category are such aids as photographic aids (training films, film strips, opaque projectors and allied equipment), sand tables, terrain boards, and similar devices.

The discussion of this phase of visual aids is considered necessary because, although instructors know the value and importance of certain visual aids, they fail to utilize them to the fullest extent and do not always take the time to plan their use. I wish to show some of the possibilities inherent in certain aids with the view of helping to make instruction more effective.

You must select appropriate visual aids. In the selection of a visual aid, instructors should consider the following factors:

(a) Will it fit into the plan of instruction?
(b) Will it help attain the objective of the lesson?
(c) Is it adapted to the group?

Prepare for the use of each visual aid. Remember, merely showing the aid is not enough. Its use must be planned in order to be effective. After the appropriate aid has been selected, the instructor must study it carefully before using it in a teaching situation. Each aid must be integrated with his plan of instruction. Make a note on the lesson plan exactly where and when the aid will appear in the lesson. The key points must be determined in advance. The manner in which it will be displayed and its relationship to other aids used in the lesson must be well planned and rehearsed. Timing is most important.

Present each aid to maximum advantage. It is also necessary to consider the specific use which each aid is to serve if it is to be presented to the best advantage. For example, posters will be displayed and used in a manner quite different from charts. When visual aids are used in group instruction, these factors must be considered:

(a) The number of students who can observe the aid at any given time.
(b) The distance from which each aid can be studied.
(c) The supplementary equipment or materials required.
(d) Seating arrangements.
(e) Lighting requirements.

I want to emphasize again, "seeing is not necessarily learning." You must teach and direct students to observe visual aids properly for best results.

Let us discuss the technique of handling specific types of aids in teaching situations.

Graphic Materials.—Here are some points which should be helpful in using graphic materials:

a. Display only one chart at a time; charts not in use should be reversed or covered.
b. Do not present more material than can be absorbed readily during a single training period. Psychologists and experienced instructors agree that under most conditions only about four or five *major* points can be covered in one 50-minute period.
c. Direct the attention of the student to the most important items in each chart. Stand to one side of the aid and use the pointer with the hand nearest the aid in order to insure eye contact and freedom of movement.
d. Stress key points and check effectiveness of training or instruction by requiring individual or group answers to questions.
e. Maintain further interest and attention by supplemental discussion, so far as time will allow, by integrating charts with practical exercises. Employ charts as a basis for tests and examinations.

Note: Posters afford excellent means of emphasizing outstanding points in instruction. Posters are NOT usually used for classroom training but should serve as a supplement to classroom instruction. Ordinarily they should be displayed at points where there is a continuous flow of traffic or where the students gather. The poster is intended as a reminder of important lessons.

The Blackboard.—The blackboard is one of the most important devices available to the military instructor as an aid to teaching. It will be found useful either indoors or outdoors. Not only do most instructors fail to make the best use of the blackboard, but in addition they also usually fail to observe good teaching practices when it is used. The blackboard is usually available when elaborate charts are not. The blackboard lends itself to the presentation of relationships between subjects by means of outlines, sketches, charts and diagrams. The blackboard is inexpensive and lends itself to quick revision of material because it can be corrected easily. Materials can be summarized quickly and left in view of the student long enough for him to obtain a mental picture of the point. In order to speed the use of the blackboard in class presentations, particularly if the instructor is speaking from an outline, he should either have the material on the board before the class enters or it should be sketched on the board very lightly so as to avoid the loss of time in aligning the material when he does place it on the board. Many times an ordinary lead pencil will make a line bold enough to permit the instructor, with the aid of properly reflected light, to follow the lines easily. Bold, heavy lines should be used, and sketches must be made large enough to be seen by the entire class. Colored chalks may be used to show contrast, to add variety, and to create interest in the diagram. Make your material on the blackboard mean something. If you have a sketch to draw, you should make a brief sketch on a piece of paper for ready reference when you go to the board. Meaningless scrawlings are confusing and distracting. They are evidences of lack of skill in the use of this particular aid. The instructor should draw or write rapidly (preferably print your work). Stand to the right of the work, and *do not talk* while facing the board. When not using material on the board step away from it and when it is no longer of value, either erase or cover the material. As in the case of other aids, if the blackboard is to be used successfully in the development and checking of correct mental images, it must be used wisely and efficiently.

Opaque Projections.—Here is a device which can be valuable in normal teaching situations. The opaque projector is an instrument designed to reflect flat pictures, photographs, maps and similar objects on a screen so that large groups will be able to see them. These materials are particularly useful and economical because they may be collected from books, magazines,

post cards, and catalogues. The chief value of the opaque projector is that it makes usable much material that is not otherwise available in films, film strips and glass slides because of the expense involved.

The still picture provides opportunities for obtaining the basic visual imagery which is essential to thinking and learning. The instructor can type or print certain key points which he wishes to stress on comparatively short notice. Again, unless the picture is well planned, thoroughly explained, and skillfully presented it may be totally worthless. Remember also, that a picture may leave much to the student's imagination.

Training Films, Film Strips and Glass Slides.—Let us discuss the training film first. It is a great training aid, particularly since most Americans are accustomed to attending the movies as a recreation. Its chief value lies in that it presents a lifelike portrayal of certain procedures. It is an *illustrated lecture* of the highest order. Psychologists say that students will remember materials presented in a motion picture for a long time. The student will unconsciously place himself in the role of the actors and actually live the situation with them. Considerable material can be presented in a relatively short time. For those of you who have not seen Training Film 7-295, "Military Training," I recommend that you do so. It is a reasonably good condensation of Army teaching methods based upon FM 21-5. TM 21-250 has superseded that manual in some instances, but the more important points remain the same.

Training films are aids to all methods of instruction and are a part of regularly scheduled instruction. They are not merely something devised for a rainy day. In the lecture method of instruction many of the training films provided are the best available aids for many difficult basic subjects. (See FM 21-7 and the "Film Bulletin Digest" published by the Signal Corps for complete lists of films available.) *Note:* The film bulletin digest contains the name of the film, synopsis of material in the film, running time, and the type of audience for which it is intended. In the conference method, films may be used to present and explain the subject or demonstrate a procedure.

In using motion pictures, it is necessary for the instructor to outline to the class at the beginning of the period exactly what is to be stressed in the film. If there are any discrepancies in the film, they should be pointed out prior to showing. A simple check on the class at the close of the period to determine what has been learned will tell you how effective the film has been. This can be accomplished by the use of a Film Quiz Card and a few simple true-false questions relating to the film itself. The film library is equipped to supply you with these cards whenever film is shown. The card will also serve as an attendance check since it is numbered serially.

Note: There is available a booklet entitled the "A B C's of Visual Aids and Projectionist's Manual," which has been prepared by Philip Mannino and published by the Educational Film Library Association, New York, N. Y. This booklet contains instructions for the operation and maintenance of motion picture equipment. Remember this: Films have never improved instruction if they only remain on the shelf.

Film Strips.—A film strip is a strip of standard motion picture film (35mm) which consists of a series of single photographs, diagrams, charts, drawings, and similar representations. The wise use of these strips will save considerable time and labor in preparation of charts and will greatly simplify certain instruction. If you desire to use this material outside, the projector can be used to project the material on paper. The desired portions of the picture may then be enlarged by tracing for use out of doors. The opaque projector can also be used in the same manner.

Lantern Slides.—Lantern slides are valuable visual aids and may be used in much the same manner as training films, film strips and opaque projections. This type of slide, while more expensive, is more desirable than the opaque projection.

Other Training Expedients.—Every effort should be made, in both outdoor and indoor exercises, to promote realism and increase interest by employing training expedients. I will not go into a complete discussion of all these expedients since many of them are not classified wholly as visual aids but are classified under the general term, training aids. Some of these expedients might include sand tables, miniature ranges, landscape targets, terrain boards, smoke puffs, blank ammunition, and similar objects and devices. A lengthy discussion of these various means are covered in FM 21-5, paragraphs 85-87, TM 21-250, chapter 8, and FM 21-8.

I have covered many points during this discussion but there are a few salient points which demand special emphasis.

First, consider the learner in preparing visual aids. You must select carefully and become familiar with the aid in order to know how to use it most effectively.

Second, remember also, that the aid must be taught, *not merely displayed*. The aid should represent an economical use of the student's time as well as the instructor's time.

Third, psychologists say that very often things seen have a more direct appeal to the student than things merely heard. Consequently they enlist more interest and the impression lasts longer. This means that practically every *lecture* and *conference* will need a visual illustration.

One final thought. The instructor's primary objective in teaching is to translate his knowledge into the language of the student. In order to do this, he must "show a picture" so vividly that no one will fail to understand. An effective means and short cut to this objective is the use of *visual aids*. Do this by appealing to the student's *sense of sight*. The fact that prepared visual aids are not available is no excuse for the instructor. It is his responsibility to teach at maximum efficiency—he may often be forced to improvise.

Exploitation Of Aerial Photography

A One-Act Play

*by Lieutenant Colonel David Radam**

Time: 40 Minutes

SCENE I
Aboard Army Transport

SCENE II
In Regimental CP

SCENE III
In Army Photo Center

SCENE IV
In Interrogation Hut

CAST
(In order of entrance)

REGIMENTAL CO . . . . . *Colonel*
REGIMENTAL S-2 . . . . . *Captain*
DIVISION PI OFFICER . . . . . *Captain*
REGIMENTAL S-3 . . . . . *Major*
PHOTO CENTER PI OFFICER . . . . . *Captain*
PHOTO CENTER PI OFFICER . . . . *Lieutenant*
COUNTERBATTERY OFFICER . . . . . *Captain*
ENGINEER PI OFFICER . . . . . *Lieutenant*
IPW OFFICER . . . . . *Captain*
PW . . . . . *Aggressor Private*

SCENE I

(Troop transports are convoying combat troops to an amphibious assault area. In mess room, officers of regimental combat team are being briefed by their commanding officer. The Regimental CO is pointing to a large situation map as he sums up his talk.)

REGTL CO: So to sum it up, gentlemen—*this* area on the beach is *our* baby. When we've secured it, and reorganization is complete, we'll move on to our main objective which is this wooded ridge right here, flanked to the right by this village.

Red and White battalions will be in assault with Blue in reserve. You men know what's expected of you and you have the time schedule.

Are there any questions? *(Pause).*

All right, S-2, let's have the intelligence picture.

(S-2 comes up to large situation map and Regimental CO walks off to one side.)

REGTL S-2: First, I'd like to introduce Captain Warner, photo interpreter from Division G-2. He'll give us his interpretation of the beach area.

(Division PI Officer comes to front of group and speaks.)

DIV PI OFF: I'd like to show you some "blow-ups" of photographs taken two days ago. You'll see enemy beach obstacles and then I'll locate them for you on a defense overprint together with defense positions and fortifications. All right, Sergeant!

(Sergeant slips photo in balopticon, turns on switch, and picture is projected on wall.)

DIV PI OFF: You'll find some concertina wire here . . . posts here . . . hedgehogs here . . . and this area is mined. Here's where you'll find . . . *(Pause.)*

(Sergeant changes photo and Division PI Officer continues.)

DIV PI OFF: Here are their antitank guns . . . dual-purpose guns . . . antiaircraft. The Navy has this information and is laying on a bombardment preceding our landing. Now let's locate these things on the defense overprint.

Distribute those copies now, Sergeant. *(Pause.)*

(Sergeant passes out several 1/25,000 scale overprinted maps and some copies of a photomap and "going report.")

DIV PI OFF: Gentlemen, I'm giving you each a copy of the defense overprint and also copies of a photomap and "going report." These were made from data extracted from the interpretation of photographs. Here's the concertina wire you just saw . . . here are your posts . . . hedgehogs . . . mine field . . . pillboxes . . . traps . . . machine-gun positions . . . antitank guns . . . dual-purpose guns . . . and antiaircraft. Also, as you can see, the photomap gives you a pretty clear picture of what to expect on the beach.

(Holds up photograph.) This was made from a group of aerial photos of the area made first into a mosaic which in turn was lithographed.

(Puts down photomap and picks up "going report.") The "going report," of course, you're all familiar with. This should help you considerably both on the beach and when you're moving inland.

(Division PI Officer moves from the front of the room to the side, where a model is shown atop a table.)

DIV PI OFF: I have a terrain model over here which we made as a replica of the beach. Its scale is 1 to 2,000. The model isn't complete, but I'll build it up for you as I go along.

(Reaching into a box on a chair beside the table, the Division PI Officer picks up several miniature defenses and places each in its proper position on the model as he continues.)

DIV PI OFF: Here's that concertina wire again . . . the posts . . . hedgehogs . . . mine field . . . pillboxes . . . traps . . . machine guns . . . antitank guns . . . dual-

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purpose guns . . . antiaircraft.

Well, that's about it, gentlemen. Aerial photography, together with other intelligence agencies, is of prime importance over terrain where you have no control. It gives you the *current* dope. A river bed, for example, could change its bank and route. A map wouldn't show that—photographs would.

(Division PI Officer returns to front of room and Regimental S-2 speaks.)

REGTL S-2: Captain, I think you should let them know the limitations of aerial photography.

DIV PI OFF: Yes, sir. We can't *always* get the picture we want. Sometimes we're stopped by enemy fighters—sometimes it's flak—sometimes it's that old demon bad weather—or the terrain might be so skillfully camouflaged that we can't make heads or tails out of it. *(Pause.)*

Are there any questions?

MAJOR: How do we go about ordering aerial reconnaissance?

DIV PI OFF: Any unit, at any time, can request it and interpreters will accurately and quickly give you the information gained. Requests should be sent through intelligence channels by the fastest means of communication.

However, Army G-2 Air will very often anticipate lower unit needs and arrange to have coverage flown prior to the receipt of requests.

Any other questions?

(After a pause, S-2 walks to the front and speaks.)

REGTL S-2: Thanks, Captain. *(Pause.)*

Now, gentlemen, let's take another look at the situation map. We know that the enemy . . .

(End Scene I)

SCENE II

(Regimental CP. In middle of stage are two tents —one for Regimental CO and Executive, and the other for S-2 and S-3. Other tents are in background.

In the Colonel's tent, the Regimental CO and the S-2 are talking and studying the situation map on the wall.)

REGTL CO: For D plus 4, we are still doing OK.

(Regimental S-3 rushes into the tent and speaks to the Colonel.)

REGTL S-3: "A" Company of Red Battalion has been pinned down by small-arms and artillery fire and forced to dig in. Battalion requests artillery support.

REGTL CO *(To S-3)*: Phone division artillery and see what they can do for us. . . . *(To S-2)*: And you get hold of G-2 and ask him to locate those guns.

REGTL S-2 and REGTL S-3 *(Ad lib)*: Yes, sir . . . right.

(Both S-2 and S-3 leave for their tent.)

(Upon arriving at the S-2–S-3 tent, S-2 calls the Division G-2.)

REGTL S-2 *(On telephone)*: Football, please . . . "two" please. . . . Hello, Colonel, this is Fairfax "two." . . . I'd like to request a special air reconnaissance mission to pick up some enemy positions that have been troubling some of our forward elements. The area is within the following coordinates: ——— ———

(S-2 returns to the Regimental CO's tent.)

REGTL CO: You sure got that request through in a hurry. Just how will it clear all those channels?

REGTL S-2: Remember the photo interpreter on the boat saying that requests for aerial reconnaissance should be sent through intelligence channels? Well, Division G-2 upon hearing from me will immediately shoot through the request to Corps G-2 Air, who, in turn, will forward the request to Army G-2 Air. As most photo missions are preplanned, Army G-2 Air will request a special priority mission of the air staff reconnaissance officer. Usually, he presents coordinated and consolidated requests. The recon officer, after learning what aircraft are available, will immediately forward the request to the tactical reconnaissance group who will fly the sortie.

Meanwhile, Army G-2 Air, down through intelligence channels, is relaying the message that the photo mission is being flown. The pilot will be briefed by the ground liaison officer—and when he understands what is expected of him, he will take off to get his pictures.

REGTL CO: How long will that take?

REGTL S-2: That depends on the communications. If there is no delay, the Air Force should be taking action in about an hour.

REGTL CO: How long before we get some information on the enemy position?

REGTL S-2: If everything clears OK, and the Air Force gives it a high priority and has a plane available, we might hear from the Army Photo Center within four and a half hours.

(End Scene II)

SCENE III

(Army Photo Interpretation Center. PI personnel are at work interpreting photos, looking through stereoscopes at photo pairs, working at drafting board, marking photos for distribution, etc. Also present are Engineer interpreters, counterbattery officers of artillery, etc.)

(PI Captain looks up from stereoscope and speaks.)

PI CAPT: Our photo interpreter team located the enemy artillery for that special mission. Things sure went smoothly. It is only 4 hours since the request came to the Recon Squadron.

PI LT: The photo also revealed what would be the best route of covered approach for "A" Company, and the tanks.

PI CAPT *(To Sergeant)*: Check on the distribution and see if 4 copies of the prints have been received here. Be sure that Corps gets one set; two sets go to the Division interested, so that Regiment can get a set; and keep one set here at the Photo Center.

COUNTERBATTERY OFFICER: I called the Division G-2 and gave him the coordinates of the enemy artillery positions. He must coordinate between Regimental

S-2 and Division artillery for front-line troop clearance. The enemy guns should be knocked out by now. This is almost as good as that Artillery spotting mission we had yesterday.

PI CAPT: Wasn't here yesterday. What happened?

COUNTERBATTERY OFFICER: The Aggressors were shelling 4 dumps and doing quite a bit of damage. Corps Artillery had located the suspected battery by flash and sound but they wanted aerial photos so pinpoints of the battery could be made on the map.

We had a special mission flown and annotated the photo with the gun location on it. Two photos went to the Corps Artillery S-2, who gave one to the battalion in best position to fire on the enemy gun, and the other marked photo went to the artillery spotting plane squadron. Using high-frequency radio for talking between the spotting plane and battery, the enemy gun was silenced in about 30 minutes.

ENGR PI OFFICER: Did they use an oblique or a vertical?

COUNTERBATTERY OFFICER: In this case they used a vertical. But they can use either.

ENGR PI OFFICER: Guess I'd better get back to interpreting. The Army Engineer sure was sold on PI this morning when I gave them the information they wanted for building a bridge over the Dee River. That area is still in enemy hands, but our boys should be able to figure out what equipment to bring up without even seeing the river.

COUNTERBATTERY OFFICER: It's been raining hard for the past week. Your information might be too old when we get ready to cross.

ENGR PI OFFICER: I used some photos taken yesterday and the river was at the same stage as it was two days previously. A change in river level at the bridging site won't alter the present Engineer plans for at least two days, and we should be there by then.

(Phone rings. PI Captain answers. After pause PI Captain speaks.)

PI CAPT *(On telephone)*: One moment, sir, while I look over the cover. *(Turns to Lt who is interpreting.)* *(To Lt)*: It's G-2. Put those photos aside for awhile and help-me find this enemy gun which is picking off our tanks up in the 2d Armored valley zone. See if we have any late coverage.

(Pause.)

PI LT: We have some cover of that flown yesterday afternoon.

PI CAPT: See if you can find any AT guns on the edge of the woods.

PI LT: I looked over this entire area on these photos this morning for that same purpose and couldn't find anything specific.

PI CAPT: Well—*(Going back to phone)*: Sorry, sir, we can't help you out on that at the moment, but at 1600 we are going over to the IPW cage with some photos of the same area, and I'll have the IPW boys question PW's who were in that area yesterday. Regiment just sent some PW's there.

PI LT *(To Captain)*: Don't hang up.

PI CAPT *(On telephone)*: One second, sir. *(Turns to Lt)*: What is it?

PI LT: I've found a mine field in that armored zone. It's at: ——— ———

PI CAPT *(On telephone)*: We have a mine field in your zone. Do you want its location? *(Pause.)* It's at ——— ———. On the gun—we will call you from the IPW cage. *(Hangs up.)* *(To Lt)*: Get those photos over to the interrogator at the PW cage. Maybe he can use them. Those prisoners who just came up from regiment might know the whereabouts of that antitank gun.

(On telephone gives IPW code No.): Lt Hamilton, please. *(Pause.)* Hello, Lieutenant. This is photo center (PC). See if you can locate an antitank gun for G-2 which is operating in the 2d Armored area. I'm sending over some aerial photos and they might help. *(Pause)* Right.

(End Scene III)

SCENE IV

(Interior of interrogation hut. Division Interrogation Officer is seated at a desk on which he has a map and some photos. A T/3 escorts a PW wearing Aggressor uniform into the room and leaves. PW salutes stiffly and the Division IO returns the salute. PW sits down, a little uneasy. IO offers PW cigarette which he readily accepts and IO lights it for him with lighter.)

IO: Have a seat. *(Pause.)* Cigarette?

My men told me that you are well informed and are anxious to cooperate. Is that right?

PW: Yes, sir. For me the war is over and I must make the best of a bad bargain.

IO: You're being very smart. *(Pause.)* I have some photographs here and I'd like you to look them over.

(IO hands photographs to PW who starts to look at them. He seems to recognize something.)

IO: That town look familiar?

PW: Yes, sir—and this woods . . .

(PW catches himself and stops what he was going to say.)

IO: What about that woods?

PW: Well, sir, I'm not sure but it looks like my battery position.

IO: Let's take a look at the map and get oriented. Now that woods you just saw would be located about here. In *this* area, I suppose we'd find a mine field?

PW *(Startled)*: That's right! How did you know *that?*

IO *(On telephone, calls G-2)*: Sir, Lt Hamilton, IPW. About that antitank gun in 2d Armored zone that PC called us about. Here's the location: ——— ———. *(Pause.)* Yes, sir—75 yards NE of ———. *(Pause.)* That's all I have. By the way, the PC sure is a big help being near by. Photos are a big help in getting tactical information. I think consideration should always be given to locating PC and IPW cages close together.

(The End)

ARCTIC FLYING

*by Oliver H. Townsend**

With the establishment of emergency bases and long-range navigational facilities in the Far North, flights over the Arctic should become as routine as a sleeper hop from New York to Los Angeles. The author of this article discusses the problems encountered today in Arctic flying.

ARCTIC FLYING? It's great, except for the fuel lines that break, the compass that spins, the rivets that pop, the tires that freeze to the runway, the oil that solidifies, the ice fog that forms, the weather that changes, plus a few other things like the cold—always the cold."

That is the typical reaction of a pilot who has been attempting to fly with standard techniques and equipment in the Far North. It is a tough job. But the fact remains that the shortest aerial route between the geographical centers of the Eurasian and North American continents passes almost directly over the North Pole. The strategic and commercial significance of this fact is inescapable. The airman has had to look to the North.

Although engineers at the Climatic Hangar of the Air Proving Ground Command at Eglin Field, Florida, can duplicate artifically the weather conditions of any part of the world, including the Arctic, "the North," as far as United States Air Force outdoor cold weather experimentation is concerned, means Alaska. As the only natural icebox under the control of this country, it serves as the testing and training locale for the development of efficient cold weather operating techniques. There are three large USAF airfields in Alaska. Ladd Field, where a special cold weather detachment of test planes is stationed, is located near Fairbanks. To the southeast and in the same vicinity is Mile Twenty Six, a former fighter strip that is being developed to handle the heaviest of our bombers. Further west, near Anchorage, is Elmendorf Field where similar developmental work is in progress. In addition to these major bases, a number of emergency fields are located in Alaska proper, and occupy strategic points along the Aleutian chain.

It takes no more than a glance to show that the Arctic is vast, empty, cold, and remote. It is a land of frequent fogs, unusual lighting effects, and weird mirages. It is a land where a barking dog can be heard five miles away, where you can see the sun when it is still below the horizon, and where a man's gloveless hands will freeze in two minutes. It is a land where an aircraft can be buffeted by 100-miles-per-hour williwaws one minute and obscured by lazily drifting mist the next. It is also a land that can be deceptively mild and luxuriant during summer months, giving the midyear visitor an entirely erroneous impression of its climate.

The progress the Air Force is making in its battle against the northern elements can best be understood by taking an imaginary journey to a USAF air field in Alaska. Imagine yourself in the operations office on a typical winter day. You are waiting to board a bomber for a routine test flight out over the Arctic Ocean. Outside it is clear and cold. During the past few hours you have watched it snow, sleet and blow. The fog has swept in, curled, swirled and swept back out again.

A C-54, giant Air Force transport, flies over the snow covered mountains of Alaska.

Air Force Photo

*Headquarters, U. S. Air Force, Washington, D. C.

The sun has shone. The thermometer now rests at minus 30° Fahrenheit.

Someone hands you your flight clothing. There is a parka, an intermediate jacket, fur-lined trousers, mukluk boots, three pairs of woolen socks and a pair of fleece-lined mittens. You ask why you do not merely use an electrically heated flying suit.

"In case of a crash landing," an aircrewman observes dryly, "there aren't many places to plug it in."

Someone else tells you not to put on your heavy clothing until you go outside. "Might perspire," they say, "and perspiration freezes out there." You are also warned against taking your mittens off for more than two minutes at a time, and especially against touching any metal while they are off. Flesh freezes to metal at Arctic temperatures.

You can see your airplane on the flight line. Its engines, wings, tail surfaces, windshields, turrets and carburetor air scoops are covered by a specially designed, waterproof material. These covers are pulled skin-tight to protect against snow, ice and frost. A layer of fabric has been placed under each tire to prevent it from freezing to the surface. To prevent frost from forming inside the cabin, the emergency escape hatch has been left open, but covered sufficiently to protect the plane's interior from blowing snow.

As you look over your airplane, you can see that Arctic operations have at least one advantage: the ground ends of the mooring ropes are merely lying on the ice. But water has been poured over them so they are frozen solidly to the surface. They are as secure as though they had been tied to permanent mooring bitts.

Since the field at which you are located is equipped with mobile heating and auxiliary power devices, the oil has not been drained from your airplane. Instead, it has been diluted with gasoline, which permits oil to retain its viscosity down to minus 60° Fahrenheit. The battery, however, has been removed and must be replaced before flight preparations are made.

About 45 minutes before take-off time the ground crew goes to work. After replacing the battery, their first job is to warm the engines and instruments with mobile gasoline-engine heaters. These are used on both jet and conventional types of aircraft. An interesting commentary on Arctic conditions is the fact that before these mobile heaters can be started, they, in turn, must be warmed by other, smaller, heaters operated by hand.

This heating process goes on for about a half-hour. Meanwhile two ground crewmen go over the whole airplane carefully to remove accumulated snow and ice. This is done with a stiff broom, and with ropes thrown over the wings and sawed back and forth. Hot air is applied to stubborn ice particles to loosen them. Hot water is not used, for it freezes and aggravates the difficulty. Chipping is not resorted to for it frequently results in damage to vital surfaces.

Ground crewmen look for ice in such unlikely places as inside the wings and fuselage, because sharp changes in temperature cause it to form there as well as on the outside. They also apply anti-freezing oil liberally to the landing gear mechanism. Otherwise loose snow tends to blow into the wheel wells on take-off and then freeze on retraction, making it difficult or impossible to lower the landing gear.

Finally the engine covers and special heaters are removed. The propeller is rotated by hand through four or five complete revolutions, then the starter is engaged. An external power cart is used as the energy source, since the chances of starting without one are remote, and may result in serious damage to the battery.

The wing and tail covers are left on the airplane until it is taxied to take-off position. Without this precaution, frost would form before the plane had a chance to get off the ground. Even a layer of hoarfrost an eighth of an inch thick might alter flight characteristics enough to prevent take-off. Accidents have resulted when proper precautions were not taken.

During engine warm-up you put on your flight gear and go outside. The cold air hits you solidly in the face and bites into your lungs. Already your breath begins to form an ice coating around the fur fringes of your parka hood. Frost congeals in your nostrils.

As you walk toward the plane you can see fog forming around the engine exhausts. This is "ice" or "town fog." It is caused when warm, moisture-laden air from engines, buildings and people meets the cold, dry air of the Arctic. Sometimes it hangs over entire air installations like an inverted teacup, bringing operations to a standstill. On certain occasions, two or more aircraft taxiing out to a runway have been known to generate enough ice fog to prevent other take-offs. While it often blacks out horizontal and downward vertical visibility, it curiously does not seem to affect upward vertical visibility at all.

Before you approach your airplane you are warned to stay clear of the prop-wash. This icy blast can cause severe frostbite. If it hits other airplanes it can undo hours of painstaking maintenance work.

During take-off the pilot must resort to a number of special techniques designed for Arctic conditions. He uses the lift of his plane's wing as early as possible during his take-off run to reduce the weight on the landing gear and cut down the ground friction caused by snow. He will keep the plane's tail somewhat lower than for normal take-off from a hard surface. He will remain prepared to fly by his instruments at any moment during the take-off run because windshield ice or frost can form in a matter of seconds.

Carburetor ice is a potent source of trouble during take-off and immediately afterwards. The initial rush of air through the carburetor causes its temperature to go down rapidly before either the exhaust or oil heat have time to build up. Ice often forms within 30 seconds after the take-off run starts. For this reason the pilot sees that the engine is thoroughly warm, then opens it to maximum power gradually, utilizing his carburetor heater to insure fuel distribution.

Once you are in the air you can see a whole new set

of operating problems begin to take shape. These have to do with such things as instruments, icing, visibility, weather, and navigation.

Most Air Force instruments, such as automatic pilots, gyros, and electric equipment, have been winterized to operate properly at low temperatures. However, because of the many peculiar effects of frost and cold, the pilot exercises considerable judgment before accepting readings.

Icing conditions in the Far North are similar to icing conditions everywhere, although they are more prevalent, being present during all seasons of the year. They are most likely to be encountered along weather fronts, over mountains, and below temperature inversions. Temperature inversions, typical of polar regions, are caused by a relatively warm air mass riding above the sub-freezing surface atmosphere. Moisture falling from the upper warm air through the colder low altitudes cools to sleet, snow or freezing rain, and forms ice. Even though very prevalent, icing can be successfully combatted in the Arctic, as it is elsewhere, by de-icing equipment and the avoidance of ice-producing areas.

After you have been airborne a short time in the Arctic, you find that visibility is adversely affected by a number of factors. One of these is fog. Besides "town fogs," mentioned before, there are also "coastal fogs." These lie in a belt close to the shore, and are formed by the differential temperature between the sea and the land. They are particularly annoying in the Aleutians, where they are so frequent that inhabitants rarely see the sun, even in midsummer when there is almost continuous daylight.

Another type of Arctic fog, composed of extremely fine ice crystals, forms over polar ice caps. It results from the condensation of moisture during cloudless periods of low temperature, high humidity and light winds. At times it completely obscures the ground, and has been known to extend as high as a thousand feet.

Drifting snow also reduces visibility. Winds of nine to 12 miles per hour raise snow off the ground sufficiently high to obscure such surface objects as rocks and runway markers. Winds of 15 miles per hour raise snow high enough to obscure buildings. Gusts of greater velocity sometimes whirl snow to a height of three thousand feet. Under these conditions vertical visibility remains generally good, but horizontal visibility is reduced to near zero.

Even when there is no fog or drifting snow, the physical characteristics of the frigid North combine to play dangerous tricks upon the senses of the airman. The effect of polar lighting and clear, dry air on depth perception, for instance, is responsible for one of the greatest hazards of Arctic flying. Distances are difficult to estimate; objects seem closer than they really are. On newly formed snow, or on a dull day, shadows are not visible. This has an effect somewhat similar to that of glassy water and gives pilots the impression they are in a vast world of nothingness, with no depth and no third dimension. Under these conditions air crews have thought themselves at a safe height only to find their planes ploughing into the snow.

The bending of light rays is another trick the Arctic plays on the aviator. The appearance, well up in the sky, of objects normally hidden below the horizon is a common occurrence in the Far North. To add to the general otherworldliness these objects sometimes are upside down.

As though the cold, the fog, the snow and the perception tricks are not enough, the Arctic is also able to produce a particularly hazardous type of windstorm known as the williwaw. These winds, which occur very frequently in the rugged Aleutians, are caused by air piling up on the windward side of a mountain, then boiling over onto the leeward side. The turbulence is not unlike that of a tornado rolling on its side. Gusts often exceed 100 miles per hour, and have been known to throw airplanes about so roughly that crew members have been knocked unconscious. Moored aircraft have been completely demolished; small boats have disappeared.

Fortunately, the pilot on your imaginary Arctic flight is an experienced one, and the weather conditions are generally good. This gives you a chance to examine some of the special problems of the navigator. To understand his chief worry all you have to do is look out of the window. There are very few identifiable landmarks, and those that do exist are either completely covered or hopelessly distorted by the snow blanket. What is more, most maps of areas above 60° north latitude are inaccurate as far as minor features are concerned. These factors make navigation by visual reference to the ground exceedingly difficult for even the most experienced Arctic flyers.

But these are not the only problems to confront the navigator. Added to his other difficulties is the fact that the earth's meridians converge at the North Pole, making the conventional method of maintaining true course impractical. For this reason, a specially designed polar "grid chart" has been developed. This chart is composed of artificial vertical and horizontal lines used in lieu of the latitudes and longitudes of conventional maps.

Other Arctic navigational problems arise from the fact that isogonic lines (lines of equal magnetic variation) can be plotted on a theoretical basis only, and are so closely spaced that a slight error in dead reckoning may assume very large proportions. In addition, the horizontal pull of the magnetic pole is so weak that the magnetic compass spins uselessly and the fluxgate compass may hold the same heading even when the plane is turned. On the other hand, the vertical pull of the magnetic pole is so strong that it induces magnetism in the soft iron of the airplane, further affecting the compasses.

The use of directional gyros, immune to magnetic influences, is also complicated because of the unusual amount of precession (a growing directional error) encountered in very high latitudes.

A further hindrance to navigation is the effect of polar conditions on radio and radar reception. Both auroral disturbances and solar activity, such as sun spots, interrupt signals for considerable lengths of time. Also, celestial navigation during the long periods of twilight is very difficult except on those rare occasions when the moon or other celestial objects are "shootable."

It is expected that Arctic flying in the future will become increasingly less difficult by the installation of additional emergency landing fields and long-range navigational facilities such as Loran.

On your imaginary flight, you, as a passenger, are not particularly conscious of many of the problems confronting your pilot and navigator. But there is one hazard of which you cannot help but be acutely aware. This is the problem of survival in case of forced landing. As you contemplate the vast, bleak landscape below, two facts stick firmly in your mind: without warmth, your average life expectancy on land is about 24 to 48 hours; without special protection, your average life expectancy in water is between 20 and 40 minutes.

The Air Force has taken every step possible to increase your chances of survival. Your plane carries many different kinds of emergency gear. There are life rafts, anti-exposure suits, emergency food kits, "Gibson Girl" radio transmitters, first aid equipment, goggles, special signal devices and extra cold weather clothing and sleeping bags. In addition, your crew has been thoroughly trained in survival technique, including an actual indoctrination test in an isolated area.

If anything goes wrong with your plane you will be told not to bail out except as a last resort. Your chief hope for survival is in making yourself easy to find. For this reason the pilot would skid the plane in, tie it down and keep it free from camouflaging snow. As soon as possible the crew would start a fire, using gasoline, oil, tires and everything else that could be scavenged from the plane. This would serve the dual purpose of keeping the crew warm and attracting the rescuers' attention. If the pilot were on course at the time of the crash, and had a chance to get out a radio flash, the chances of rescue would be excellent.

An L-5 at Fort Richardson, Alaska, lands and picks up an accident victim. The victim has been given first aid before being put aboard the plane.

Air Force Photo

Everything goes well, however, and upon returning from your imaginary Arctic flight your pilot is careful to keep the engines warm while letting down. He descends with considerable power, for otherwise the throttle, carburetor, and cylinder head temperatures would fall rapidly. He pumps the brake pedal several times while lowering the landing gear to insure circulation of sluggish oil. If the airplane's wing is iced-up he will bring the ship in fast and level, stalling it a few feet off the ground. Once down, he uses the brakes sparingly to prevent wheel locking on the icy runway.

Immediately after landing the ground crew takes over the airplane and continues the battle against the cold by diluting the engine oil, cleaning the shock struts, removing the battery and draining the oil tank pumps before the accumulated moisture can freeze.

As a result of your imaginary flight, you might form the impression that you have learned all there is to know about Arctic flying. You haven't. Your trip was made under ideal polar conditions. When it gets really cold even winterized equipment and hardy, experienced personnel must give up the fight. Typical of the unique type of problem encountered at lowest temperatures is that presented by the varying coefficients of expansion of different metals. According to one popular story circulated among Arctic flyers, a C-54 transport laid over in a minus 65°F temperature shrunk fourteen inches in length, leaving control cables so slack they could not be manipulated.

In summary, it might be said that air operations with conventional modified equipment can be carried on from Arctic bases at temperatures down to 35° below zero. Beyond that, additional winterization of aircraft and equipment is required.

In evaluating the progress made in Arctic air operations it should be remembered that the problems encountered in flying *from* the Arctic regions are vastly more complicated than those encountered in flying *over* the Arctic regions from temperate zone bases. Once an airplane is airborne, cold becomes much less of an obstacle than it is on the ground. Through Air Force training programs, better weather forecasting facilities and improved navigational procedures, the problems of flying *over* the Arctic have been virtually solved. Illustrative of this is the 10,000-mile flight of the Pacusan Dreamboat from Hawaii over the Arctic regions to Cairo in October, 1946.

With the establishment of emergency bases and long-range navigational facilities in the Far North, flights over the Arctic should become as routine as a sleeper hop from New York to Los Angeles.

2d Armored Division Combat Loading
Normandy
CONCLUSION

by Lieutenant Colonel F. M. Muller

IN the invasion of France through Normandy, known then as Operation Neptune, the role of the 2d Armored Division was the exploitation of the established beachhead; the Division was a part of the "follow-up" units of this gigantic undertaking.

This treatise will cover that phase of the operation that pertained to the combat loading and unloading of the 2d Armored Division.

Preparation

In late November 1943 the 2d Armored Division departed from Palermo, Sicily and moved to the United Kingdom disembarking at the ports of Liverpool, England and Glasgow, Scotland, then moving to an assembly area at Tidworth, England. This water movement was merely an administrative move; all vehicles remained in Sicily; new vehicles awaited the Division at Tidworth, England.

During the period December 1943 to May 1944 the Division engaged in vigorous training of all types in preparation for the coming invasion. In May 1944 elements of the Division participated in operation Fabius, a landing exercise conducted by First U. S. Army off the southern English coast. This exercise had considerable training value, however the majority of the personnel involved did not actually participate in the landing maneuvers.

Loading

On June 6-7, 1944 the Division (less the rear echelon) moved to the marshalling areas in the vicinity of Southampton-Portsmouth, and Weymouth, England. The Division, minus Combat Command A assembled in the Southampton area while Combat Command A assembled in the Weymouth area. Composition of these elements was as follows:

2d Armored Division:

Combat Command "A"
- Hdqrs CC "A"
- 66 AR
- 14 AFA Bn.
- 41 A1B (—)
- Co. "A," 17th Armored Engineer Bn.
- Co. "A," 48th Armored Medical Bn.
- Co. "A" Maintenance Bn.
- Det. Co. "B" Supply Bn.

Combat Command "B"
- Hdqrs CC "B"
- 67th AR
- 78th AFA Bn.
- 1st Bn. 41st A1B
- Co. "B," 17th Armored Engineer Bn.
- Co. "B," 48th Armored Medical Bn.
- Co. "B," Maintenance Bn.
- Det. Co. "A" Supply Bn.

Division Control
- Headquarters Co., 2d Armored Division
- Headquarters Division Artillery
- 142d Armored Signal Co.
- MP Platoon, Service Co.
- 195 AAA (AW) Bn. (SP)
- 702 TD Bn. (SP)
- Det. D-9 Co. "B," 6901 ECAD
- Det. F-165 Sig. Photo Co.
- 1 Plat. 608th QM Co.
- Maint, Medical, Engineer and Supply Bn's (—)
- 92 AFA Bn. (—)
- 82 Recon. Bn.

Two Division TQM's were appointed and reported to their respective loading areas about one month in advance of the Division. There these TQM's worked directly with Sector to insure correct planning of stowage in accordance with the Division's plan.

The over-all functioning of the Marshalling Area Headquarters, Sector Headquarters, and Movco and Buco is rather complex; it is not the purpose herein to describe this system, however, see Annex No. 6 for a cursory explanation of the command and movement channels.

The Transportation Section of Sector actually was responsible for the pre-stowage plans of all units embarking at that port. The Division TQM actually templet loaded his own ships and craft at Southampton in conjunction with the requirements of Sector. This proved highly advantageous in regard to the allocation of units to ships and craft, especially from a tactical aspect. Although Sector was furnished with complete loading plans from Buco, which in turn received the plans from the combat units, frequent changes in regard to the type and number of vehicles, proved that a

TQM permanently functioning at Sector was quite beneficial, especially when considering the channels involved to make changes.

One major principle involved in this operation was that for the first time the Division did not have to completely embark themselves; here Transportation Corps and allied Services of Supply took over this function. This was somewhat new to the 2d Armored Division which was quite accustomed to doing it themselves.

Templet stowage plans were completed about June 1, 1944 and on June 6-7, 1944 the Division moved to its respective marshalling areas. The Marshalling Area Headquarters and Sector then took over the reins of loading and moved units of the Division to the "hards" (docks) and proceeded to load the Division in accordance with the templet plans.

No major difficulty was encountered in loading the LST's and LCT's of the Division. Minor difficulties such as racks on vehicles, unknown obstructions, necessitated minor revisions in the over-all plan. A clean-up pool was established for any vehicles which could not be loaded on their designated ship or craft due to unforeseen eventualities; these vehicles were shipped across very soon after the Division sailed.

Even though the Division was part of the "follow-up" phase of this operation, all vehicles were still waterproofed and were combat loaded. This of course was done to insure the landing in any circumstance.

The forward elements of the Division sailed on D+3 or June 9, 1944; the bulk of the Division departed from the loading areas on D+4 or June 10, 1944.

Unloading

The Division landed on Omaha Beach east of Carentan, France. By the time the Division landed (D+4, D +5, D+6) this beachhead was a well-established and organized locality. Landing was relatively easy: the LST's and LCT's beached themselves at high tide, waiting until low tide then unloaded their contents. In most cases vehicles drove onto dry sand, in others, it was necessary to go through a small amount of water. No difficulty of any magnitude was experienced.

Vehicles quickly were routed to dewaterproofing areas where all vehicles were made ready for combat, then they moved to an assembly area in the vicinity of the Cerisy Forest. The whole Division was closed in this area by June 16, 1944.

Recommendations and Conclusions

a. *General*

The vastness of this operation and the fact that the combat loading and unloading involved the over-all operation prohibits the author from making any recommendations of vital content. In brief, the Division's role was a small one in a large undertaking, consequently, the recommendations and conclusions will be similarly limited.

b. Recommendations:

(1) That a DivisionTGM be present with Sector Headquarters during the templet loading.

(2) That a more centralized control of units in the Marshalling Areas be given the Division Commander.

(3) The units be thoroughly trained in the loading and unloading of LST's prior to any operation.

(4) That some system of control be furnished the Division Commander while at sea in order to insure his complete knowledge of the whereabouts of any of the ships or craft transporting his units.

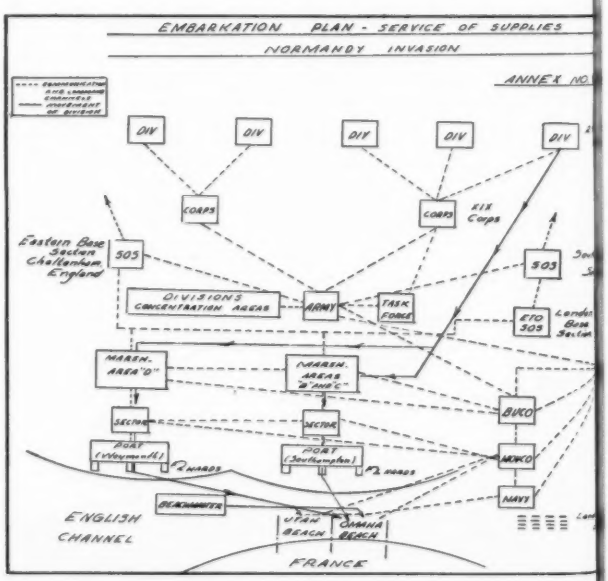
(5) That a more adequate system of guides be established to insure rapid assembly of units in the dewaterproofing assembly areas.

(6) That all personnel charged with the templet loading of units be extremely well trained personnel.

c. Conclusions

The summation of this operation can be stated as quite successful, especially when considering the Sicilian and Moroccan campaigns, yet the operations are quite different, especially in scope.

Here as in the former amphibious operations control is the criterion—this is mandatory. All personnel must be thoroughly trained in the loading and unloading of ships and craft, especially drivers. Constant liaison must be maintained with the Service Troops charged with the loading, preferably by an officer of the Division Staff (A.C. of G-4 Section) who is thoroughly familiar with amphibious operations and the tactical plan of the Division Commander. In brief, the success of such an endeavor can be assured before the ships and craft leave their ports of embarkation—this assurance is accomplished by meticulous planning and thorough training to develop teamwork.



ARMORED DIVISION MILITARY POLICE

by Major Joseph W. Jogl

THE Army recently announced a change in the Tables of Organization for the armored division military police unit, increasing its size from a platoon of three officers and 84 men to a company of seven officers and 167 men. In so doing, the Army has recognized the almost unanimous request from the various division provost marshals for a unit of company strength and organization. Most divisions found it necessary to reinforce their platoons to at least this strength. The question might be brought up as to the necessity for that many MPs.

The division military police has one major mission: to serve the command. This is accomplished by providing traffic control on marches, establishing and supervising the traffic circulation net in the division zone, operating prisoner of war collection points, controlling the circulation of civilians behind the lines, apprehending and detaining violators of army regulations and rules of conduct, protecting the soldiers in the rest areas from trouble emanating from various sources, as well as a number of odd duties pertaining to police and security.

The type of person required to actually perform these duties has obsoleted the practice of bestowing a man with an armband and expecting him to carry out the duties of an MP as impractical. The modern military policeman is a specialist as highly trained as a radio operator, gunner or mechanic. His place on the division team is as important as that of the tanker or the infantryman, and after he has mastered his individual specialist training, every effort must be made to train him as part of the entire team. He must have intimate knowledge of the division organization, its style of marching, its commanders and individuals, and the manner in which it can be employed so that in the event that he is lacking full and complete orders, he can evaluate the situation from the information he has, to take appropriate action without depending on receipt of orders through channels. This requires a man of better than average intelligence, besides one physically capable of working long hours under any kind of strain or circumstance. Obviously, such selection and training take time, but the mastery of this knowledge can result in great value to the division when he is used in that capacity for which he was trained.

One daily service the military police perform for an armored division is the control of its traffic. With attachments and overstrength, a division has nearly 3,000 vehicles. Broken down roughly, there are about 1,000 combat vehicles, 1,000 two-and-one-half-ton trucks with trailers, with the balance including all types from a quarter-ton truck to a 40-ton tank recovery tractor semi-trailer. It requires from 150 to 240 miles of road space to move the division; moving at the rate of 15 miles per hour, the length of time past any given point extends from 10 to 16 hours. The size and weight of the vehicles make every narrow spot in the route, every weak bridge, every poorly surfaced road an obstacle that must be considered in the traffic control plan. When the division is not on the road, but in a bivouac or assembly area, the constant flow of administrative and supply traffic requires close and constant supervision of the traffic net. Besides the stationary traffic posts and march column control, it is necessary to take steps to control reckless driving that will endanger other traffic, to restrict the movement of sightseers and others needlessly consuming gasoline on non-essential trips. Control of civilian traffic in the combat zone also comes under the traffic section.

Keeping in mind this background of the size and special characteristics of the armored division, let us consider how the traffic control plan for a road march is formulated with the provost marshal's employment of his military police in its execution. Normally, any movement of the division, other than a tactical one in its own zone, is ordered by a higher command. The G-3 and G-4 work together, and with technical advice from the engineer and provost marshal concerning roads, bridges and traffic conditions, issue the division march order. According to the field manuals, the engineers and the MPs should make a personal reconnaissance of the route before the order is issued. Actually, there are very few moves made where there is an opportunity for them to physically check more than the first few hours' march. They have to depend upon their knowledge of the route and a map study to formulate the plan for traffic control; then leaving enough in advance of the column to make a detailed survey of the route, they can revise the original control plan as they go.

An example based on an actual situation will demonstrate some of the problems with which an armored division provost marshal is faced.

In the fall and winter of 1944 the armored divisions arriving in France were moved from the beach to the front by road over a distance of about 500 miles. The route one of these divisions used started on the Normandy peninsula, crossed through the Falaise gap area, ran through Paris, Chalons and Verdun and into position in corps reserve north of Luxembourg City. It passed from the jurisdictional area of the Normandy Base Section into the British zone, through several base sections, ADSEC, two Army areas, a corps zone, ending in two divisional areas. The movement was coordinated through theater headquarters who informed all of these organizations. However, contact with the Normandy Base Section traffic control unit indicated their information in regard to the size and movement of the division was not complete; the provost marshal was instructed to contact all traffic control agencies along the route of march to give them information concerning column arrival and clearance times in their areas as well as the column make-up. The Provost Marshal also used the opportunity of this contact to obtain road information and to determine what control would be furnished by the local detachments. By this means arrangements were made in Paris with that base section unit to provide a motorcycle escort for each company through the city; the success of this led to similar procedures through other large towns.

The march was made over one route with the division divided into two columns, each taking six days to complete it with the second column starting one day after the first. The daily march averaged about 75 miles, each column occupying about 110 miles of road space; which meant that the head of the column had finished its day's march before the tail of the column had left bivouac, while the head of the second day's column was arriving in the bivouac before the first day's had cleared the area. Time prevented a full route reconnaissance, so traffic control plans had to be made from a map study which showed such a variation in the number of contemplated traffic control posts for each day's march that it was decided to use the platoon, less 12 men detailed to headquarters, as a unit. The platoon was to precede the first day's column by one hour to post the road. Each crew was to remain at its post until the platoon maintenance and supply section, which were the last vehicles in the second day's column, released it after refueling its vehicles and performing required maintenance. The released crews then proceeded to the head of the first column to be available for the next day's march. With the platoon employed in this manner, the Provost Marshal had available the maximum number of men at the head of the column for use in emergencies, and still was able to insure uniform control over the road for both columns. A road reconnaissance covering at least the first three hours' march for the following day was accomplished the day before. The daily I.P. times were before daybreak so this was essential for an intelligent posting of the first few posts each morning, as well as to gain time and get ahead of the column to properly survey the remainder of the day's march.

The accuracy of the Michelin road map was such that the actual execution of the plan worked almost as laid out in the original study. There were several places in the Bocage country where battle damage to towns and roads required adjustments in the plan. Near Paris the civilian traffic required more control than originally planned; this was particularly true on hills where it was necessary to prevent head-on collisions when division vehicles were passing the civilian charcoal-burning trucks. A small reserve was maintained to meet these unexpected obstacles. It was impossible to post every crossroad, or road fork, so if a unit commander desired, he could use his own personnel to supplement the road control placed by the MPs.

To aid the movement into bivouac areas, a release point was designated where the MP column control ended and the billeting officers were assigned to meet their units to guide them into their bivouacs. The MP operating the point obtained detailed information concerning the location of the units, in order to be able to direct stragglers to thier units; this post remained in operation 24 hours a day. The MP road patrol reported the location of all disabled vehicles and stragglers along the route of march. In this manner the battalion commander could determine the status of his stragglers and they in turn could receive directions to their bivouacs.

To undertake the task of controlling a movement of this magnitude was a challenge to the small platoon. Fortunately, the liaison established with the various traffic control agencies along the route of march assured the provost marshal enough aid to cover the route with only one exception—the city of Paris. The roads into Paris were so congested with civilian traffic that the platoon reserve was exhausted before the route through the city could be posted. The motorcycle escort provided by the city MP detachment did an excellent job, but the thrill of going through Paris and the opportunity to sightsee led a few vehicle drivers astray so additional guide posts were necessary. The men from the division who were detailed to help in this case actually were more of a hindrance than assistance. Unaccustomed to working alone, they found their lack of training for the job resulted in little confidence in themselves and the ability to do what they were asked, so all it meant to them was a chance to spend a few days in Paris. It is literally impossible to detail men to do traffic control duty on the spur of the moment and to expect satisfactory results. That is one of the reasons for trained MPs.

From Paris to Luxembourg the road was straight and well travelled; all the large towns were staffed with MP detachments with whose help the division MPs

were able to give adequate coverage to the column. In Luxembourg proper, the infantry division MPs responsible for the city at the time had already efficiently signed the route and provided escorts for the column through the town.

This being the division's first march, the experience gained on it formed the basis for the procedure followed during the balance of its stay in the theater. On each march the provost marshal contacted all traffic control units along the route to fully inform them of the details of the division march order up to the release point which was therein designated. Until a means to reinforce the MP platoon with permanent personnel was found, the platoon was given additional men mounted in quarter-ton trucks to help control the column; also, individual unit commanders were informed of certain "rules of the thumb" regarding location of MPs: namely, if there was no MP at the intersection, the route lay straight ahead.

To illustrate the impracticability of using untrained personnel for traffic control duty to supplement the platoon-sized unit let us consider what happened when one division was being employed in making a penetration. As it gained momentum the number of prisoners captured each day grew, the supply lines lengthened and the platoon, operating with only 38 of its 84 men due to attachments to combat commands and division headquarters, could manage its simple traffic and prisoner collections and evacuations only by doubling up on duties. When calls came from G-2 and G-5 for security missions or special tactical movements, there were no men available; to provide for these, the division band was attached to the military police platoon.

But on the same day that this attachment became effective, the division accomplished a break-through, capturing a vital objective so important that four infantry divisions were passed through the division zone in the following five days. Units moved into the area from all directions with no regard to march unity; the road net was limited; destruction in the towns and to the roads restricted the movement of the traffic and made almost all roads open to one-way traffic only. This situation required well-trained clearheaded MPs. Working the entire day with no relief, there were still not enough men to fully handle the road net. The bandsmen were placed at the secondary posts and for a while they were able to hold their own; but as soon as the officer or noncom would move down the road, the lack of confidence in themselves and their judgment began to show and the traffic at their posts became tangled. Even though their willingness was unequalled, the fact that they were not trained for the job prevented them from giving adequate assistance. They were finally used in this operation to handle prisoners where supervision by seasoned MPs could be held to a minimum so that the balance of the police section might be available for traffic duty. Traffic was moved with but few minor disruptions in this operation only because the officers and the handful of men left for the operation of the platoon worked unrelieved and untiringly for the entire period.

Following this operation the division received a rest of almost two weeks during which time 12 of the best prospects from the band were given intensive training in traffic control; by the end of the war, two months later, these men were performing traffic duties in a highly satisfactory manner. The remainder of the band was trained to process prisoners of war, thus relieving the trained MPs for traffic control work.

So far, the traffic control considered has been typically administrative and confined to the division area behind the combat command. Control of tactical movements within the combat command zone was quite another problem. The infantry divisions were able to organize small detachments of men whom they trained for use as Regimental Combat Team military police platoons. These were a part of regimental headquarters and provided both traffic control and prisoner of war processing personnel at that level. The armored combat command was not as well supplied with infantry personnel as the regular foot infantry and due to the flexibility of the combat command organization, it was not practical to organize these detachments. This resulted in the division MP platoon being called upon to send their men to the combat commands for these duties. There were not enough available to make this more than a token force, so other than minor traffic control around the combat command CP and in the near-by areas, they were of little help except at the supply point or in facilitating the trains in and out of bivouac. The provost marshal could do little to aid the combat commander beyond sending this detail.

In a wide open exploitation, the problem of traffic control was greatly simplified. Because the rate of movement was fast and the infantry had been left behind, there was no conflicting traffic on the road. Only critical turns and the narrow town streets needed supervision. The biggest obstacle was the congestion formed by the civilians and displaced persons who had to be kept off the road. The axis of supply was marked with a distinctive sign so that liaison officers and supply vehicles could readily and easily follow the division.

A withdrawal presented still another problem. Constant road reconnaissance to the rear was necessary so that the traffic officer would be fully familiar with the road net. Tight control of all traffic up to the battalion areas had to be maintained to insure rapid movement of maneuvering forces and unimpeded advance of reinforcements. The MPs remained at their post until the last units of the covering force appeared.

The collection and evacuation of prisoners of war comprise one of the problems of the armored division which remained unsolved. The very nature of an armored team is such that each man is a cog in the machine; his absence reduces the efficiency of that team to the extent that the armored commander is reluctant

to take prisoners. Yet the employment of armor results in the opportunity to capture far more prisoners in a shorter length of time than any other type of unit.

In a stable situation, it is possible to utilize the supply trains from the combat command area to the division and from the division to army to evacuate the prisoners. This system was used to good advantage in the ETO.

The evacuation from the division back to army was primarily the concern of the division military police platoon, the procedure for which followed a set pattern. Both the army and division collecting points were adjacent to or near the respective Class I dumps, making it possible to utilize the daily ration train to evacuate the prisoners without loss of time or needless travel. The normal number of trucks available was 12, with a capacity of about 900 men if well packed! This was sufficient to take care of normal operations. But once the armor had forced a penetration and begun to move and expand the break-through, the system began to break down, as there were increased numbers of prisoners and the Army Class I supply points did not keep up with the rapidly moving columns. Emergency rations were used so the normal ration supply vehicles were loaded with gasoline and ammunition, the only items on which there was a resupply. The dumps for these were established well ahead of the Army prisoner of war cages and too much time would have been lost had these convoys been used to evacuate prisoners.

The trail of an armored division could be traced by its prisoner of war collecting points until the momentum of the drive was halted. Then, with close cooperation from the G-4 and the quartermaster who provided transportation, these cages were closed out. The MP platoon in one division had five two-and-one-half-ton trucks in excess of the normal number of authorized vehicles to carry the additional bandsmen who had been assigned to them; using this pool of trucks, they managed to evacuate a large portion of their prisoners. Whenever army established a new collecting point within a day's march of a division cage, the prisoners were marched in.

The movement from the combat command to the division collecting points was far more difficult. The MP detachments working with the combat commands ran the collecting points there evacuating those prisoners. Frequently, in rapid movements, they needed help. The S-4 had to give full cooperation in furnishing transportation to the detachment as they had no vehicles suitable for moving large numbers of men. When the division column followed one of the combat commands, the latter's problem was negligible; there was plenty of supply traffic on the road and little trouble was encountered in closing out its cages. As long as the other combat commands were operating in contact with the one the division was following, the prisoners did not present too much difficulty. It was on the exploitations and independent actions that the situation became acute; the most practical solution was to make arrangements with the infantry division in the rear to take over their prisoners.

Any plan for handling prisoners must include rapid collection from combat troops and expeditious evacuation from the division collecting point. If the time that is lost by battalion or combat command staffs begging for help is used to determine a means of evacuation instead, many of these problems will never arise. To set up a basic plan until the load becomes too heavy for it, when it will become necessary to employ a little ingenuity to keep the situation under control, is the only system at the present time that has been devised.

Civilian circulation is one other problem which requires special handling by the MPs. Those of us who were in Europe can remember the constant shifting of the peoples. As the Allied Armies rolled across France and gave every indication of going on into Germany, the French population started a movement to return home. Every road was crowded with every type of transportation imaginable; this constituted a serious threat to army movement; it was countered in the rear areas by designating certain roads for military use only.

The MPs duty was to keep military thoroughfares free from civilian traffic. In the divisional area there were more troops so it was possible to better control this civilian movement when the situation was normal.

Towns along the front were evacuated by cooperation with the division G-5. Civilians had to be controlled; and if it became apparent that there was to be a mass civilian exodus or influx or if the military situation required a mass evacuation, a definite plan had to be formulated to handle this, a collection or assembly point set up and an orderly evacuation accomplished, using secondary routes or empty transportation returning to rear areas.

During the Bulge the problem of refugees was extremely serious; they came from the Bulge area on every road pushing carts, baby carriages, in wagons drawn by oxen and in motor vehicles. Every one had two things in common: first, each was overladen with his dearest possession; and second, each was utterly terror-stricken and anxious to hasten as far away from the Germans as possible. It required cool, calm and firm action by the MPs to channel these people into the evacuation routes designated for their movement. The success of the reinforcement of the battle lines to counter the German threat depended upon open roads as that was the means by which the reinforcements arrived. The plan for handling the refugees worked nicely and the unfortunate circumstances of May and June of 1940 was not repeated.

The function of the armored division military police mentioned herein are those which are most affected by the characteristics of that type of division; in addition, they must operate town patrols, perform other normal police duties and activities. There are no special aspects to these that are not common to all military police units;

these are well covered in the manuals.

There was one serious oversight in the equipment allotted to the military police platoon in the ETO. There was no radio or wire communication authorized. An outstanding example of the necessity to provide the MPs with a means of communication other than messengers is pointed up by an incident which occurred immediately following the capture of the Remagen Bridge.

Traffic control headquarters, located at Stadt Meckenheim, was to allot all road priorities. Troops of all types were moved in as fast as the roads could take them. Bombing had made the route through Rheinbach and Stadt Meckenheim open to one-way traffic only, while the rubble and bomb holes made the road extremely rough, necessitating traffic to move slowly; coupled with air attacks, there were periods when the bridge had to be closed for traffic.

A regulating post was established, and a man with a pair of field glasses could observe the bridge and determine whether it was opened to traffic. If it was closed, he could hold the column under cover of the heavy woods until he saw traffic moving over the bridge again. This was done to prevent a concentration of men and vehicles in the town.

The only drawback was that the rest of the posts in the chain could not be notified to hold up their traffic accordingly. This resulted in considerable confusion: double banking and long queues of vehicles lined up bumper to bumper.

On the second day, a 399 Radio was sent into Remagen to work with a similar set in Stadt Meckenheim; enough vehicles were detailed from the reconnaissance squadron to place one at Arzdorf, Berkum, Birresdorf, the near side of the Remagen Bridge and at the two 399s. With this communication net, traffic on the north road was effectively controlled.

The difference between traffic flow with radio control and without it was such that it enabled the platoon to procure 510 radios as soon as it was relieved from its traffic duties at Remagen.

Despite the handicaps of too few men handling too many duties, the lack of communication and other deficiencies in equipment and organization, the armored division MP platoon as constituted in the ETO rendered excellent service. It was guided by the principles outlined in this article and the examples cited really did work. There is no doubt that better solutions to the problems encountered can be found, especially with the newly authorized strength of organization, and in many future conflict, we should find the division military police unit ready and able to give its parent organization all the service it might require. Every member of the unit should be well acquainted with the goal of the military policeman and the manner in which he can be of service to his division; also every commander and staff officer in the division should recognize the limitations of the MP unit so that it can be used to the best advantage for the division as a whole. With this unity of spirit and purpose the value of the military police unit can be unsurpassed.

JUST PUBLISHED

RIDING AND SCHOOLING HORSES

By the late

Brigadier General Harry D. Chamberlin

Written primarily for the novice, *Riding and Schooling Horses* can be read and studied advantageously by the most experienced horseman. The ARMORED CAVALRY JOURNAL has just published a limited edition of this famous horse book. The supply isn't expected to last too long. To make certain that you get your copy it is suggested that you place your order immediately. ORDER TODAY.

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Editorial Comment

Christmas Greetings from General Devers

To All Members of the Army Ground Forces:

Once again it is my happy privilege to extend to you every good wish for joy and prosperity during the holiday season and throughout the year to come. On this, the third Christmas since the cessation of hostilities of World War II, it is my fervent prayer that the peace which we are striving to maintain be a just and lasting one. I ask of you men in the Armed Forces, particularly the Ground Soldiers, scattered as you are throughout the world, that you do your utmost to perform your duties in a manner that will reflect only credit upon yourselves and the nation you represent. Let our hope be that our country will remain as strong as it is just, and that through its desire for justice for all mankind it will contribute to an everlasting peace throughout the world. During this Christmastide, and during all those to come, free men must have the right to exclaim, "Merry Christmas and a Happy New Year."

JACOB L. DEVERS
General, USA

1948 Olympic Equestrian Trials

The 1948 Olympic Equestrian Trials which were held the first week in October at The Ground General School Center, Fort Riley, Kansas, came to a lusty end when wind and rain combined to wash out the jumping events and dressage Exhibition. These trials were held to assist the United States Olympic Equestrian Committee in their selection of the horses and riders to compose the equestrian training squad for the Olympiad scheduled to be held at London, England, in August, 1948.

The equestrian events for the Olympic games consist of three separate competitions, The Three Day Event, the Individual Dressage Test, and the Prix des Nations jumping competition. The Three Day Event comprises three separate tests that were to be held on successive days. The same horse and rider had to successfully complete each test in order to qualify for a place in this event. The first day was a schooling test designed to prove the lightness and suppleness of the horse. The second day was an endurance, speed and cross-country test aimed to show the endurance of a good hunter when well trained and brought to its best condition. The test covered about 21 miles that had to be completed without pause. The third day, which was cancelled due to weather, was a jumping test designed to demonstrate that on a day after a great effort the horse retains that energy required for a hunter to continue in service. A scoring system of credits and penalties for each test was used to determine the final order of the contestants.

The winners of the schooling test of this event were: In first place, Swing Low, age 14, with Lieutenant Colonel Charles Anderson up; second place, Reno Palisade, age 7, Colonel Earl F. Thomson, Captain of the Army Equestrian Team; third, Major Vix, age 6, Captain J. Burton; and fourth Reno Rythm, age 6, Lieutenant Colonel Frank Henry.

The endurance phase of the three-day event was won by Swing Low, Lieutenant Colonel Charles Anderson up; second place to Reno Rythm, Lieutenant Colonel Frank Henry up; third, Reno Rocket, age 6, First Lieutenant Henry Burnett up; fourth, Sightseer, age 14, Lieutenant Colonel Charles Symroski up.

All riders were able to complete this test without the imposition of any time penalties. Since this was the objective of each contestant, no one necessarily attempted to obtain a maximum bonus for undertime as all were interested in conserving their mounts as much as possible for future competitions.

Although the jumping test was cancelled because of rain after three horses had completed the course, there was every reason to believe that all horses would have successfully completed the third and final phase. The cumulative standing at the end of the second day of competition was as follows: First, Swing Low, ridden by Lieutenant Colonel Charles H. Anderson, plus 7 points; second, Reno Rythm, ridden by Lieutenant Colonel Frank S. Henry, minus 10 points; Third, Major Vix, ridden by Captain Jonathan R. Burton, minus 52 points; Fourth, Reno Palisade, ridden by Colonel Earl F. Thomson, minus 58 points.

The individual Dressage test was one which required the ultimate in lightness, suppleness and complete absence of resistance in the horse. Because of the extreme difficulty of the test, very few horses and riders can compete successfully in this event. The winner of this event was Reno Overdo, ridden by First Lieutenant Robert Borg; second place was taken by Olympic, ridden by Colonel Hiram Tuttle, retired; third by Peter Brown, ridden by Colonel Tuttle; and fourth, Goranda, ridden by Lieutenant Alfred R. Kitts.

The Prize of Nations jumping Competition was held over a course of jumps varying from approximately 4 feet 3 inches to 5 feet 3 inches in height and with a water jump of 13 feet in width. All jumping was governed by the rules of the International Equestrian Federation.

The competition was originally scheduled to be held on two separate days, but rain forced the cancellation of the second day's jumping. Results of the first day ended in a four-way tie for first place between Roll On, ridden by Lieutenant Henry Burnett; Nipper, ridden by Lieutenant Colonel Charles Symroski; Brown Bubbles, ridden by Captain John Russell; and Air Mail, ridden by Captain Jonathan Burton. All of these horses had clean performances over the sixteen-obstacle course.

Judges for the trials were Major General Guy V. Henry, U. S. Representative of Olympic Equestrian Events and former Commandant of The Cavalry School; Colonel John T. Cole, former captain of the Army Equestrian Team; Colonel J. W. Wofford, retired, and Colonel Franklin F. Wing, member of the Army Equestrian Team who was unable to participate because of a broken collarbone.

Equestrian Team to Europe

In preparation for the equestrian events of the 1948 Olympic Games at Aldershot, England, next August 9-14, the United States Army Equestrian Team of nine officer-riders, all of Fort Riley, Kansas, and 28 horses were shipped to the Army Remount Depot at Bergstetten, Bavaria, this month, for winter training there and at the Munich-Reims Race Track, the Chief of Special Services, Department of the Army, has announced.

Twenty horses, accompanied by Lieutenant Colonel Harvie S. Ellis, Army Veterinarian, and First Lieutenant Robert J. Borg, one of the riders, were shipped from New York, Friday, October 17. Two other riders, Lieutenant Colonel Charles H. Anderson and Captain John W. Russell, departed soon thereafter. Eight horses and four riders were to depart by boat after November 28. The latter group remained to participate in the National Horse Show at Madison Square Gardens, New York, November 4-13, and in the Royal Winter Fair at Toronto, Canada, November 18-26.

The four riders who remained until after the National and Toronto horse shows in which they will participate included Lieutenant Colonel Franklin F. Wing, Jr., Lieutenant Colonel Frank S. Henry, Lieutenant Colonel Charles A. Symroski, and Captain Jonathan R. Burton. Colonel Earl F. Thomson, Captain of the Army Equestrian Team, departed for Europe Monday, October 20.

26th Cavalry (PS) Monument

A monument to the heroic members of the now-famous 26th Cavalry, Philippine Scouts, was dedicated at Fort Stotsenberg on September 7, 1947, on the very spot where the regiment was activated. Many of the former officers and men of the regiment were on hand to witness the dedication.

Colonel Marcus Jones, formerly the Adjutant of the 26th Cavalry Regiment, and now with Hqs. U. S. Military Advisory Group, was the principal speaker for the ceremony. He was introduced, fittingly, by Captain Masiclat, who had been the Sergeant Major of the Regiment.

In his speech, Colonel Jones gave a brief history of the organization, listed its former commanding officers, and told of the fine record the organization had made in its gallant defense of the Philippines at the time of the Japanese invasion in 1942. Colonel Jones stated that the regimental motto was "Our strength is in Loyalty" and stated that "I am proud to say that every man practiced and lined up to its fullest meaning." He further stated that "Its exploits in Bataan will go down in history and be likened to those of the famous U. S. 7th Cavalry 'Custer's Last Stand.' "

The monument, cut from marble in the state of Georgia, is a replica of the one erected at Fort Riley, Kansas, with money provided by the 26th Cavalry Memorial Fund. The Fort Riley memorial was dedicated in 1942 after funds had been raised for the monument among officers of the 26th Cavalry, many of whom had been on tours of duty at that post, then the main U. S. Army Cavalry post.

Not to be outdone by the members of the famous Cavalry Regiment, military personnel at Fort Riley also contributed to the extent that in the final accounting of funds it was found that much more had been contributed than was needed for the Fort Riley monument. It was then that the authorities in charge of the fund de-

26th Cavalry (PS) Monument.

cided that a replica of the Fort Riley monument should be erected at Fort Stotsenberg, the home of the Regiment, following the close of the war. It was this monument, the second to be erected in honor of the famous Philippine Scout organization, that was dedicated Sunday at Fort Stotsenberg.

The 26th Cavalry Regiment (PS) was activated October 1st, 1922 at Fort Stotsenberg, with officers from the 9th U. S. Cavalry and the 25th Field Artillery (PS). The enlisted personnel were transferred to the Cavalry regiment from the 25th Field Artillery Regiment (PS), which had been inactivated the day previous. Colonel Edward Anderson was the first Commanding Officer of the Regiment.

Annual Meeting

The annual meeting of the United States Armored Cavalry Association will be held at the Army and Navy Club, Washington, D. C., at 8 P.M., Monday, January 26, 1948.

This meeting is held for the purpose of electing officers and transacting of such other business as may properly come before the meeting.

There are a number of very important matters to be taken up at this meeting. It is desired that all members of the Association be present.

1st Cavalry Division History

All former members of the 1st Cavalry Division are requested by Major General William C. Chase, Commanding General of the Division, to send their present addresses to the: Historian, 1st Cavalry Division, APO 201, c/o Postmaster, San Francisco, California, so that they can be placed on the list of those to receive a free copy of the 1st Cavalry Division History when it is ready for distribution. Extra copies and copies to persons other than ex-members of the Division will be sold through the Book Department of the Armored Cavalry Journal. The History, which contains hundreds of excellent photographs, is scheduled to be distributed in the near future. It is being published in Japan.

BOOKS FOR THE HORSEMAN

Horsemanship and Horsemastership, Vol. I	$ .85	A Horseman's Handbook on Practical Breeding, by *Colonel John F. Wall*, U.S.A., Retired (3d edition)	4.00
Horsemanship and Horsemastership, Vol. II	1.10	Thoroughbred Bloodlines, *Wall*	25.00
Horsemanship and Horsemastership, Vol. III	.65	Breeding Thoroughbreds, *Wall*	3.75
Horseshoeing	.45	The Horseman's Encyclopedia, *Self*	5.00
Gaits and the Horseman	.60	Fun on Horseback, *Self*	3.00
Seats, Gaits and Reactions	.85	More About Riding Forward, *Littauer*	3.00
The Military Seat	.15	Position and Team Play, *Devereaux*	1.50
Care of Leather	.25	Horses, *Self*	3.00
FEI Rules (International Equestrian Federation)	.45	The Western Horse, *Gorman*	3.00
Thoroughbreds	2.05	Training and Gaiting, *Scharf*, 2 volumes	4.00
Deep Through the Heart	2.45	Heads Up—Heels Down, *Anderson*	2.50
Black, Bay and Chestnut	2.45	Riding and Training, *Farshler*	5.00
Riding and Schooling Horses	4.00	Light Horses, *Rooks*	2.00
Trail Dust and Saddle Leather, *Jo Mora*	3.00		

Armored Cavalry Journal

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OTHER BRANCHES

Major General R. W. Bliss

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(Editor's Note: All members of "Other Branches" are encouraged to contribute to this section of the ARMORED CAVALRY JOURNAL. *The "Other Branches" section in the next issue will feature a statement by the Chief, Chemical Corps and a full-length article on the Chemical Corps and its activities.)*

The Army Medical Department is the guardian of the health of the soldier. Its services extend from those of the "Medics" with the familiar red cross arm bands who accompany combat troops into battle to those scientists surrounded by an array of retorts and test tubes in far away laboratories. It includes in its ranks, physicians, surgeons, dentists, veterinarians, men versed in the allied medical science, nurses, and women medical specialists.

The Department considers as its most important job not the care of men after they have become ill, but the prevention of illness itself. To this end it strives through its research to keep pace with the constantly changing times by coordinating its program with that of the medical research of the nation and to insure superior medical service by maintaining the highest professional standards among its personnel.

The Army Medical Department welcomes the opportunity given by the Armored Cavalry Journal to have its personnel become acquainted with the activities of other branches of the Army and also welcomes the opportunity to present its views so that other branches will become acquainted with the Medical Department.

R. W. Bliss

Major General, U. S. Army,
The Surgeon General

MEDICAL DEPARTMENT

Atomic Warfare Confronts Army Medical Department

*by Major General Raymond W. Bliss**

THE Medical Department of the Army, like every other branch of the national defense, is shouldered with the gravest responsibilities in the present unsettled and threatening world situation.

Our problem is solely one of defense—to protect the health and lives of soldiers with the most advanced and effective means medical science can provide for us under conditions and against weapons and diseases at present unpredictable. This word "unpredictable" is most significant. We often feel that we are in a quite different situation than we ever have experienced before.

In the past we always have known, to some extent, our major enemies. Battle wounds, combat neuroses, epidemic diseases have not changed greatly from war to war. It has been possible to predict what they would be like, and constantly to encourage and take advantage of research into ways of protecting our soldiers against them.

But there are some special problems today which we never have faced before and in respect to which, it seems, our responsibilities are particularly great. We only can say that we are doing our utmost to meet these responsibilities as we see them.

First: The medical problem of atomic warfare. It is reasonable to suppose that in any future major war the enemy, as well as ourselves, will make use of atomic explosives at least as effective as the atomic bombs dropped over Japan in the closing days of the last war. In our preparations we cannot have any assurance that there will be any practical outlawry of such weapons. Such a bomb kills and disables by heat over a small radius, by shock waves, and by invisible radiations of various sorts moving with essentially the speed of light. Concerning this third, and most serious, effect medical science stands only at the threshold of exact knowledge. Radiation injury of any kind never has been a problem for the medical profession at large or the army before. It hardly has been a serious problem anywhere, except for workers with powerful x-ray apparatus in laboratories and hospitals. The exploding atomic bomb disperses gamma radiation of the same sort as comes from the x-ray, but far more powerful. Here there is a little guidance to be had from the experience of the past. It also disperses radiations concerning which there is no guidance at all—invisible showers of countless millions of alpha and beta particles, and neutrons. A little information of the effects of these has been obtained from studies of the population of Hiroshima and Nagasaki.

Naturally the Medical Department is carrying on studies of its own—especially through the Army Institute of Pathology. It is vitally interested in studies under the auspices of the National Research Council and the Atomic Energy Commission and those which are in progress in various universities. But quite frankly, at present very little can be offered in the way of medical defense against the most sensational weapon in the history of warfare. The responsibility is fully recognized and accepted. It may well become the gravest of all our responsibilities. But there is no magic nostrum—nor any great likelihood of any—which will offset the effects of radiation and soldiers cannot be immunized against ionizing radiations. There is little enough that we can offer at present—but to vigorously investigate any lead that promises increased protection or better therapy and the promise to keep fully abreast of the medical science of the world, insofar as its reports are available to us, in this field and to have ready the best defense possible in the light of advancing knowledge. We have the fullest confidence that the medical profession of the United States will be at least abreast of any potential enemy.

For the first time in history there is serious talk of diseases occurring under unexpected conditions. Against such diseases the major defense would be medical. It is encouraging to know that our own Army and Navy have given great consideration to defense measures against all types of diseases that may arise through natural or unnatural means. We are probably in as good a position as anybody to protect our soldiers and our people. But the possibilities of unexpected disease outbreaks are beyond prediction. At least we are on fairly familiar ground, so far as general methodology is concerned the prevention and stopping of epidemics

*The Surgeon General, U.S. Army.

long has been a major function of the Medical Department.

But it is realized fully that these shadowy and terrible ogres of future warfare cannot be allowed to distract our attention too much from the ancient enemies which are certain to be encountered in any conflict. Wherever great numbers of men are thrown in close contact, as is inevitable in military operations, there is the threat of epidemic diseases—of typhus, typhoid, cholera, plague, the various forms of dysentery—which have been far more prolific killers than any enemy weapons known in the past. These are set loose by no human enemy. They are evils of Nature itself and are as much a threat to one side as to the other. The last war came fortunately after a period of enormous progress in the field of preventive medicines when fairly effective prevention and control measures had been produced against the majority of these scourges. The results are shown clearly in the army's health record. We were in the fortunate position of seldom being obliged to treat typhus or cholera because we could prevent them.

But we cannot allow ourselves to rest on our accomplishments. The protective measures are far from perfect. We realize only too clearly that statistics are deceptive. Some medical men whose opinions are entitled to respect are somewhat skeptical as to the importance of some of the protective measures in achieving the Army's remarkable health record. They feel that immunity conditioning of the population also was an important factor. Constant efforts are under way, both in the Army itself and in civilian institutions cooperating with us, to improve protective measures. Eternal vigilance is necessary. Bacteria and viruses have a remarkable facility for undergoing "changes" and appearing in deadlier forms against which present methods of protection are of unpredictable value.

In the past the areas of war have been circumscribed to areas with a limited number of deadly diseases. The first world war, for example, was fought largely in Europe where the armies did not have to worry about outbreaks of cholera or yellow fever. The second world war was essentially world wide. There was no disease known to man to which some soldiers were not in danger of exposure. This will be even more the case, it is likely, in any future major conflict. Military medicine, more than ever before, must be universal medicine.

It is freely predicted, for example, that polar regions will be important war theaters. Thus the Medical Department must be prepared to deal effectively with all pathological conditions peculiar to intense and prolonged cold. It must develop new standards of nutrition, clothing and shelter to protect the health of troops.

At the start of the last war we were blessed with various new and extremely potent antiseptic agents—the sulfa drugs—and soon developed the greatest lifesaver of all, penicillin. This exploitation of a research finding was probably the most significant achievement of American science under Medical Department auspices. But here again too great reliance cannot be placed on what has been accomplished. There are ominous indications of the development of resistance to these agents on the part of disease organisms. The germ killers must constantly be improved, their effects watched from day to day, and new agents developed.

Our present job is primarily "preparedness." So far as scientific preparedness is concerned we must lean heavily on medical and allied science as a whole. The Medical Department of the Army can do much to advance the general science of medicine, especially in certain fields. It must keep abreast of present amazing medical progress and undertake or support fields of research likely to prove of special value in case of another war. Certainly, of course, it will contribute to and cooperate with every worth while endeavor along these lines to the utmost extent possible with its personnel and resources.

It clearly has the responsibility of seeing that the best medical science has to offer is available to our soldiers in the hands of thoroughly competent physicians. The medical officer must be professionally competent. It is the desire and intention that he be superior. This can be achieved only if the Army offers to the brilliant, enterprising, ambitious young medical graduate the opportunity for as successful career in the service as he could hope to achieve in civilian practice. Moreover he must be assured full opportunity to undertake essential medical research and to practice his profession at bedsides with sick men and women. There has been some criticism in the past to the effect that the army doctor soon becomes overwhelmed with administrative duties, such as require no particular knowledge of medicine or surgery, and with "paper work" such as could be done as well or better by a competent warrant officer. So, it has been charged, he finally falls behind his profession and loses interest in medicine, per se.

There may have been some grain of justice in these criticisms. Under the present reorganization of the Department, however, they will not be valid in the future. Exceptional encouragement is being offered the young doctor to enter the army and remain there in a progressive medical practice either as a research worker or a clinician. He will have an assured and adequate income. Of even more importance to the ambitious doctor, he will be given facilities for study and research which he hardly could hope to enjoy in civilian practice. Above all, he can rest assured that he will function purely as a physician—not as a clerk or drill sergeant.

When the next war comes, the Medical Department feels, the best medical defense that can be offered will be an alert corps of highly competent and progressive doctors who with the medical and allied professions have already solved many of the problems that will be encountered and who are capable of meeting any new situation that may arise. This will be the case whether the major enemy weapon is nuclear radiation or germ bombs, whether the major disease is typhus or some invisible horror which is not yet known in the world.

UNITED STATES AIR FORCE

CLIMATIC HANGAR
—USAF Freezes Airplanes In Florida

*by James A. Niland**

THE Florida travel brochures probably will never mention it, but there's a place in the Peninsula State where the temperature has been down to –65°F. And in the same place the temperature can rise sufficiently to embarrass a Florida press agent.

All this variation in climate is available at the Air Force's Climatic Hangar, Eglin Field, Florida, headquarters of the USAF's Proving Ground Command.

The purpose of the Hangar is to provide climatic testing for planes and equipment, identical to climatic conditions found anywhere in the world.

The idea for this facility was conceived during the war years by former Lieutenant Colonel Ashley T. McKinley, to obviate the necessity of transporting men and equipment to all parts of the world for proof testing.

Air Force specifications require that all aircraft must function perfectly within a temperature range of –65°F. to 165°F. In pre-Hangar days, the AF, to meet these test requirements, transported men and equipment to Alaska, Panama and elsewhere, by an expensive and time wasting process. Day-to-day natural temperatures are rarely constant. Tests had to be made rapidly and if not completed one season had to be held over to the next. Because of the distant locations required for this type of testing, close contact was lost between designers, manufacturers, and the testing organization. Much time was lost in hauling equipment found unsatisfactory, from testing site to manufacturing plant.

These wastes of time and money are eliminated by the Hangar. Under one giant roof, all types of equipment and matériel can be tested simultaneously or individually in the many small test rooms.

The Main Test Room is 250 feet wide and 200 feet long, with ceiling heights varying from 35 feet at the sides to 70 feet at the center. This area is large enough to house four B-29s, a few B-25s, some smaller planes and equipment all at the same time. In fact, the Air Force's giant B-36 bomber can be rolled into the Hangar for testing, with space to spare.

Nowhere else in the world is there a facility so large and so complete where climatic conditions of all kinds can be produced. The refrigeration equipment needed to chill the 3,000,000 cubic feet of air to a –65°F. is an unprecedented engineering feat. Three stories high, capable of delivering 9,000 horsepower, it is one of the

Alaskan Huskies held at bay by Lieutenant Henry Watters seem perfectly contented in the minus 70 degrees F. weather offered by the Climatic Hangar at Eglin Field.

*Headquarters U.S. Air Force.

latest engineering wonders of the world.

To produce tropic heat there are two 125-pound steam water tube boilers. Special construction features have been incorporated to insure perfect operation under extremes of temperature and pressure. The walls are insulated with thirteen inches of glass wall board, and the ceiling is slung in place by chains to compensate for extremes of pressure that may develop inside. The doors, through which planes pass, weigh 200 tons each and are operated on miniature railways by built-in motors.

Under the Hangar roof surrounding the main test room are many smaller rooms: an Engine and Equipment Test Room, a Tropic Marine Test Room, a Desert Test Room, Jungle Test Room, Arctic Test Room, All-Weather Test Room, and an Altitude Chamber.

The Tropic Desert, Jungle and Arctic Test Rooms are comparatively small and maintain constant climatic conditions consistent with their titles. Into these are placed matériel and equipment for long range testing. For example, packaging equipment might be left in any of these rooms for six months to a year to determine its protective qualities.

The Engine Test Room and the All-Weather Test Room, like the Main Testing Room, are equipped to provide world-wide climatic conditions. Installed in both rooms is equipment capable of providing raging windstorms, and into these winds other machines can inject sand, rain, sleet or snow.

The All-Weather Test Room is lined with stainless steel, welded at all joints. A typical test for this room would be the inflation and launching of a rubber life raft and the maintenance of a plane crew under varied weather conditions.

In addition to these rooms, there is a strato-chamber capable of providing pressures and temperatures corresponding to those encountered at an altitude of 80,000 feet.

The Main Test Room is so equipped that a plane being tested can do everything but take-off. Engines roar, bomb-bay doors open, dummy bombs drop into pits and guns are fired through fiber target panels out to a gunnery range beyond the walls of the Hangar.

To keep pace with aviation's new jet power, a jet engine air unit can supply up to 103,000 cubic feet of air per minute for jet intake.

Started in 1943 the Hangar was officially completed in the spring of 1947. The first major test was conducted in June of this year. It was a cold test in the Main Testing Room during which a B-29, P-80 jet fighter plane, C-82, P-51, P-47, an R-5 Helicopter and an M25 Light Tank and M5 tractor were tested.

Tests were started at 0°F. and conducted at ten-degree increments down to –65°F. At each 10-degree drop, motors were run; in fact every movable part was operated through a complete cycle. Even the Helicopter was put through tests which necessitated sand bags being lashed to the wheels to prevent it from ramming against the ceiling.

As a complete test was made of every item on the floor at each decimation, detailed records were made. These records were checked against the decimated rises in temperature after the low of –65°F. was reached and the temperature was brought up to zero where the tests started. The "down" and "up" comparative checks provided contrasting data which had never before been compiled.

When the low of –65°F. was achieved, planes and matériel were covered with a heavy layer of frost. The corners of the Hangar were piled high with snow formed from condensation of warm air caused by entrance of personnel through the air lock entrances. Each time the air lock door opened a veritable snowstorm ensued. Yet while test personnel plodded around the Hangar floor dressed in heavy arctic clothing, a hundred or so feet away other personnel of the Air Proving Ground Command sweltered in the hot Florida sun which had the outdoor thermometers pushing past the ninety degree mark.

We were able to observe the tests at the –65°F. mark. In a room near the air lock entrance to the Hangar we perspired our way into the boots, heavy trousers, coat and hood, then managed to make it to the small air lock entrance. Once inside the Hangar, the warmness of Florida soon gave way to frosted eyelashes and numbed fingers, made numb perhaps by the novelty of running our hands through snow in Florida.

The value of the Hangar to all branches of the armed services is inestimable. According to Brigadier General Carl A. Brandt, who heads the Air Proving Ground Command, the facilities of the Hangar will be made available to all branches of the National Military Establishment of the United States.

A Boeing B-29 Superfort is shown here undergoing tests in the Climatic Hangar.

New ORC Program

*by Major General Edward S. Bres**

This article, written by the Executive for Reserve and ROTC Affairs in the Department of the Army, discusses at length the new affiliation plan of the Organized Reserve Corps. General Bres, the author, also writes about other missions of the ORC and what it offers each Reservist. This is another special article published by the Armored Cavalry Journal to keep Reservists posted.

A NEW PHASE of the Organized Reserve Corps program is in its first stages of implementation. This is the affiliation plan, which provides for various type units to be sponsored by, and affiliated with, industry.

World War II brought out the necessity for having sufficient and adequately trained service personnel. While the principle of affiliation is not new, the scope of the present program will greatly exceed anything that has been done in the past. Units of this type have been proven to be the most economical way to increase the military potential of the nation.

Affiliated units, because their personnel is already proficient in a civilian specialty, offer a tremendous saving in the time that would be required for training in a comparable unit with no previous experience. During World War II, 54 units were sponsored by the railroad industry. They came into active service not only as experienced individuals but as highly competent teams. If it had not been for these units an extensive training program would have been necessary which would have delayed our supply and transportation system at an extremely critical time.

Some example of the type of civilian concerns suitable for the affiliation program are:

Potential Sponsor	*Type Affiliated Unit*
Chemical Mfg Companies	Chemical Laboratory Units
Gen Contractors & State Depts of Public Works or Highways	Engineer Construction Units and Engr Gen Service Units
Municipal Fire Depts	Engr Fire Fighting Units
Municipal Depts of Public Works	Engr Utility Detachments
State and Municipal Police Departments	Military Police Units
Colleges and Universities	Military Govt Units, Strategic Research and Analysis Units, etc.
Hospitals and Medical Schools	General & Evacuation Hospitals
Mail Order Houses and Large Retail Distributors	Depot Units
Automotive Industries	Ordnance Maintenance Units
Laundries	Quartermaster Laundry Detachments
Baking Companies	Quartermaster Bakery Units
Mortuary Concerns	Quartermaster Graves Registration Units
Telephone Companies	Signal Construction, Operation & Maintenance Units
United States Post Offices	Army Postal Units
Railroads	Railway Operating & Maintenance Units

*Executive for Reserve and ROTC Affairs, Department of the Army.

Aircraft, Automotive and Allied Industries	Air Service Groups, Air Depot Groups, Air Repair Squadrons, Air Engineer Squadrons, Air Matériel Squadrons and Air Supply Squadrons.

December 7, 1941 demonstrated the fact that we were far more unprepared for an enemy attack than had generally been supposed. This in spite of the fact that for approximately one year previous we had been operating the Selective Service System. It also established the fact that mere training is in itself not sufficient. Units must be organized, equipped and trained during times of peace instead of waiting until the clouds of war have gathered.

Developments in both science and in the practical aspects of warfare have also reduced time, distance and natural barriers to the extent that they can no longer be relied upon as initial protective forces.

As in the case of Pearl Harbor, it can be assumed that any future conflict will be undeclared and will initiate with a sudden surprise attack. While no prediction can be made as to where such an attack would center, it is reasonable to assume that such an attack would be directed at our centers of industrial production and transportation systems.

Should such an attack occur, a great portion of the work necessary for a quick recovery could be undertaken by affiliated units. These units would be available to the army commander concerned for his use in the restoration of industrial and other facilities, such as transportation, signal communications, power lines, medical, police, fire, etc. Other units could perform routine supply problems, move into unharmed areas to aid in the reconversion of plants to war production or be assigned to tactical units.

Should affiliated units be called to active duty, individuals in these units would perform those military functions for which they are best qualified. In most cases these duties will be the same or closely allied with their civilian employment. In addition, other members of his unit would be people with whom he had been working in industry.

The sponsor of an affiliated unit will be required to furnish the maximum number of officers and key enlisted personnel required under the appropriate Table of Organization. In the event a sponsor's personnel is limited, other available members of the Reserve Corps not employed by the sponsor may be utilized with the consent of the sponsor. Either the sponsor or the War Department may terminate an affiliation agreement by written notice at any time.

The training of affiliated units is a special problem due to the fact that no rigid schedule is applicable to all types of units. Training will of necessity vary depending upon the type of units, local facilities, personnel strength, interest and cooperation of the sponsor, availability of funds, etc. To make training as flexible as possible a sponsor may make a choice of various combinations of armory type training or summer field training. He may select:

1. Weekly armory type training periods plus 15 days of summer field training for Class "A" units.
2. Twice monthly training periods plus 15 days' summer field training for "A" and "B" units.
3. Monthly training periods plus 15 days' summer field training for "A," "B" and "C" units.
4. Monthly training periods with no summer field training for "A," "B" and "C" units.
5. Quarterly training periods and no summer field training for "A," "B" and "C" units.

The quantity and type of home training equipment issued to affiliated units will depend upon the type of unit and its status (A, B, C). Field training equipment will be made available to a unit only upon its arrival at a training area.

In addition to the affiliated portion of the Organized Reserve Corps program, the Organized Reserve Corps has several other missions.

By tradition and our concept of government, the responsibility for our national security cannot be borne in its entirety by our Regular Army. The major responsibility for the national security must be delegated to the civilian components. This type of system has several advantages:

1. Its efficiency depends primarily on expert professional control without having its leadership concentrated exclusively in a professional soldier class.
2. Organized Reserve Corps personnel are encouraged to develop their capacity for leadership.
3. Intelligent and widespread public opinion is provided as a basis for the determination of all public questions pertaining to military affairs.
4. The Regular Army is not required to maintain units to perform duties which can be undertaken by Organized Reserve units and National Guard. Thus, reducing the size and the cost of the regular peacetime establishment.

The Organized Reserve Corps includes both officers and enlisted personnel. In the event of an emergency the Active Reserve must be capable of supplementing the Regular Army and National Guard forces by furnishing:

1. Units that have been effectively trained and organized in time of peace for rapid mobilization, expansion and deployment. These units in the required types and numbers, together with the Regular Army and National Guard, constitute forces for the Army of the United States.
2. Additional trained personnel, both commissioned and enlisted, which will be required to bring the Regular Army and National Guard forces to full war strength, and also provide for the expansion of the Army of the United States.

3. A reserve or pool of officers with military experience who will be eligible for such assignments as their past experience and current capabilities qualify them. These officers can therefore, be called for special types of duty permitting the organized units to remain intact and not cannibalized as was done prior to World War II.

The organization of the Organized Reserve Corps is a departure from the type of Reserve forces which existed prior to World War II. What we had then was an Officers Reserve Corps organized into units of officers only and these were essentially paper units. There were approximately 3,000 Enlisted Reservists who enlisted primarily as a means to secure commissions. No enlisted personnel were assigned to units nor was any equipment provided for training.

In 1940 the Officers Reserve Corps approximated a strength of 100,000. Of this number about 6,000 were all that remained of the 200,000 officers who served in World War I. The decrease from 200,000 to 6,000 in a period of 21 years is of value to note when we measure our present Reserve officer strength of 503,000 with 20 years in the future. Of the remaining Reserve officers approximately 94,000 were secured principally from the Reserve Officer Training Corps units of our educational institutions. Immediate need for many of these officers arose when a state of emergency was declared in August 1940, and by Pearl Harbor Day over 80,000 had been called to duty, individually, to augment the officer personnel of the Regular Army and National Guard forces.

With this dispersion prior to, and the continued great need of these officers on, December 7, 1941, even the paper officer units had been entirely dissipated and not one of the units as such was called to duty. Again, many of the officers on duty had been promoted and no appropriate vacancies existed in the units to absorb them had they been returned to their former reserve unit assignment. Our planning for officer personnel strength had been too conservative. We had provided in all components an approximate strength of 135,000 officers, when 800,000 were actually required. However, to prevent a recurrence of this condition, in our postwar army, the Organized Reserve Corps will contain full strength units fully trained and with unit equipment ready to be mobilized on M-Day. Units in the Organized Reserve Corps are divided into three classes—A, B, and C.

1. Class A units are full war strength units consisting of a full complement of officers and enlisted men, plus all required equipment for training and initial mobilization.
2. Class B units are organized with a full complement of officers and at least a minimum strength cadre of key enlisted personnel and essential training equipment.
3. Class C units will have a full complement of officers only. In addition to the Reserve personnel assigned to units, there will, of course, be a large pool of both officer and enlisted personnel who will be available as fillers and replacements for the Regular Army, Organized Reserve Corps and National Guard.

At the present time, on purely a voluntary basis, the Organized Reserve Corps numbers approximately 503,000 officers and 630,000 enlisted men.

The organization, administration, and training of Organized Reserve Corps units is the responsibility of each Army and Air Force Commander within his respective area. Generally, within each state a Military District Office has been established which is directly responsible for the administration of the civilian components. Exceptions to this are where the density of population is not sufficiently great to warrant a district for each state. In cases such as this, one office may handle two or more states.

Activation of Organized Reserve Corps units did not start until late in 1946. By August 1, 1947, over 5,000 units had been activated. Included in this total are 24 divisions. Under the Organized Reserve Corps troop basis, ground units are allocated in conformity with the density of population, geographical location, etc. In general, it is broken down to each of the six Army Areas and consists of the following types and numbers of units:

Units	*Numbers*
Divisions	25
AAA	40
Armored	37
Cavalry	27
CAC	104
FA	223
Tank Destroyer	3
Military Police	194
AG	1,062
Chem W. S.	130
Engr	1,007
Misc (Intell, Photo, Band)	1,089
Ord	826
QMC	1,514
Signal	428
MC	1,068
Transp	547
Total	8,324
	40
	8,364

Within each Army Area a further breakdown to each state is made by each army commander.

Various types of training are presently offered members of the Reserve Corps, some of which are:

1. Attendance of Reserve Officers at Regular Courses and at Associate Basic and Advanced Courses at all Army Ground Forces and Technical and Administrative Service Schools.

2. Fifteen days' indoctrination courses conducted by the Army Ground Forces Service Schools during the summer months.
3. Detail for not more than ninety days of specially qualified Reserve Officers, to higher headquarters to include the War Department, Headquarters Army Ground Forces, Offices of the Chiefs of Technical and Administrative Services, Army Headquarters, Corps Headquarters, Service Schools and RTC's.
4. Year-round training of company-grade officers at RTC's for a minimum of twelve days exclusive of travel time, and a maximum of thirty days including travel time.
5. Fifteen days' detail to Combat Teams or larger size (Battalion or Company size Technical units) Regular Army Units, and with National Guard Units during field periods.
6. Detail as instructors at ROTC institutions and summer camps, of highly specialized Reserve Officers for not less than fifteen days or more than ninety days.

In addition to the training that is being offered to help each Reservist maintain his proficiency, various other procedures have been established, some of which are:

1. A recent War Department circular authorizes the granting of Reserve commissions to non-regular officers now on active duty. It is anticipated that about 75,000 Reserve officers will be obtained in this manner, increasing the total Reserve officer strength to approximately 580,000 and permitting for the first time a complete survey of the Officers Reserve Corps.

2. Procedures have been established recently which permit the direct appointment in the Officers Reserve Corps of warrant and flight officers and the first three grades of enlisted men. Boards to screen applicants are now or soon will be appointed, and it is expected many valuable junior officers will be obtained. Enlisted men below the first three grades, if eligible, may now qualify for a commission through attendance at Officer Candidate Schools.

3. An inactive duty training pay bill for the Organized Reserve Corps was presented to the Congress in the form of two Bills, S 1174 and HR 3227. The Senate passed without amendment S 1174, however, the House did not act on either of the bills prior to adjournment.

4. Active duty training for both officers and enlisted men of the Organized Reserve Corps was initiated in January of this year. This program will be considerably expanded during the coming fiscal year.

5. The majority of the postwar policies of the Organized Reserve Corps have been implemented by the publication of War Department Circulars. Only a few policies remain to be published and implemented in the field.

6. To assist the active program of the Organized Reserve Corps, commanding officers of Reserve units may be ordered to active duty to assist in the organization and development of their own units.

7. The deadline for application for commission or enlistment in the Organized Reserve Corps has been extended from June 30, 1947 to the date of termination of the present emergency.

8. Transfers between branches of the Organized Reserve Corps are authorized.

9. The Honorary Reserve has been established to provide a permanent military status for many categories of personnel who cannot remain in the Active Reserve.

10. Procedures have been established whereby army commanders may retain for Reserve use facilities or parts of facilities declared surplus to the needs of the Army. Many such surplus installations have been retained and are now in use by the Organized Reserve Corps.

11. Over 600 instructors have already been assigned to Reserve duty, and this number is being increased as rapidly as qualified personnel can be made available.

12. Open hearings on the non-disability retirement bill for the Reserve components, HR 2744, have been completed. The bill has been approved and is being actively supported by the War Department, the Navy Department, and all civilian components.

13. The modern postwar series of extension courses are being completed as rapidly as possible and made available to the Reserves.

14. Forty-one Air Reserve Bases are now in operation and over 310,000 hours have been flown by Reserve pilots to date. One thousand two hundred eighty-seven aircraft of various types have already been delivered to Reserve Bases.

15. Active duty for Air Reserve officers has been initiated with the attendance of numerous officers at the Air University and Command and General Staff College.

Personnel of the Organized Reserve Corps assume certain duties and obligations. Officer and enlisted personnel voluntarily obligate themselves to serve the nation in a military capacity after Congress has declared the existence of a national emergency. In time of peace, an officer is appointed for five years, an enlisted man enlists for three years. Both officer and enlisted personnel are required by regulations by the Secretary of War to maintain certain standards of efficiency and professional knowledge in order to retain their Reserve status.

The plans for the organization, training, and administration of the Organized Reserve Corps are established and the organization and development of units is well under way. The successful support and development of the civilian components, both the Organized Reserve Corps and National Guard, in conjunction with the regular establishment will afford this country adequate national security.

Postwar Army Extension Courses

ARMY EXTENSION COURSE postwar program, one of the most far-reaching and comprehensive programs of military education ever undertaken by the Army, is now well under way with nearly 150 courses currently available to qualified personnel, Army Ground Forces has revealed.

In addition to those now available, new courses are now in the process of preparation by the various arms and services, and it is anticipated that approximately 1,000 will be completed within the next three years.

Established in March, 1946, the postwar program is primarily designed to provide a systematic course of home study for members of the Organized Reserve Corps and the National Guard.

An important step in the implementation of the program was taken this past August when Army Ground Forces held a service-wide Extension Course conference at Fort Belvoir. Leading result of the conference, at which matters of general policy were discussed, was to effect a closer coordination between the ground arms and technical and administrative services in the administration of the program.

The courses, which are being administered by the various ground and administrative and technical schools in the six Army areas, are arranged in six series of subcourses for each of the arms and services, and are adapted according to the military grades of the enrollees. They are designated as follows:

10-series—for basic instruction of enlisted men and Warrant Officers; 20-series—second lieutenants; 30-series—first lieutenants; 40-series—captains; 50-series—majors; and 60-series—lieutenant colonels.

Each complete series consists of approximately 15 subcourses, numbered serially in the order in which they are normally studied. A subcourse consists of at least three and not more than nine lessons and an examination or review lesson. To maintain an active enrollment, a student is required to complete at least 10 lessons in one or more subcourses annually.

The following is an example of a subcourse broken down:

Subcourse 40-10 "Joint Air Ground Operations."
Lesson 1. Joint Operations of Tactical Aviation.
Lesson 2. Planning of an Attack Against an Organized Defensive Position.
Lesson 3. Conduct of the Attack Against an Organized Defensive Position.
Lesson 4. Coordination and Control During a Pursuit.

A development in the program, recently approved by the Department of the Army, concerns the granting of extension course credit for resident courses previously taken at branch schools. Officers and enlisted men who successfully completed courses at any branch school during the war, and who enroll for extension courses, are now given credit for those subcourses which parallel the material already taken, and are exempt from repeating them.

Applicants for enrollment who are assigned to Reserve or National Guard units should apply to unit commanders or instructors who forward applications for students of the ground arms in courses of the 10-series to the Ground General School, Fort Riley, Kansas; for students of the ground arms in courses of the 20-series or higher to the school of the appropriate branch; and for students of the administrative and technical services in any series to the school of the appropriate branch. Applicants not assigned to units should apply directly to the Army commander in the local Army area.

Following is a list of the schools and available courses:

		Originating School
THE GROUND GENERAL SCHOOL		
10-2	Leadership, Discipline, Courtesy, and Customs of the Service	Ground General School
10-3	Drill and Physical Training	Ground General School
10-4	Map and Aerial Photograph Reading I	Engineer School
10-5	Interior Guard Duty	Ground General School
10-6	Military Sanitation	Medical Field Service School
10-13	Military Law—The Law of Military Offenses	Judge Advocate General
10-15	Individual Weapons	Ground General School
20-2	Methods of Instruction	Infantry School
20-3	Military Law—Courts Martial	Judge Advocate General
ARMORED SCHOOL		*Originating School*
20-2	Methods of Instruction	Infantry School
20-3	Military Law—Courts Martial	Judge Advocate General
20-4	Tank Gunnery—Direct Fire	Armored School
30-1	Administration II	Adjutant General's School
30-2	Training Management	Armored School
30-3	Terrain Evaluation	Armored School
30-5	Estimate of the Situation and Combat Orders	Armored School
40-1	Map and Aerial Photograph Reading III	Engineer School
40-2	Rules of Land Warfare	Judge Advocate General
40-7	Staff Functions Tank Battalion	Armored School
50-1	Staff Functions Combat Command	Armored School
50-3	Combat Command in Attack	Armored School
ARTILLERY SCHOOL		*Originating School*
20-2	Methods of Instruction	Infantry School
20-3	Military Law—Courts Martial	Judge Advocate General
20-4	(FA) Field Artillery Matériel	Artillery School
30-1	Administration II	Adjutant General's School
30-3	(FA) Terrain Evaluation	Artillery School
30-3	(AAA) Electronics	Artillery School
30-6	(FA) Combat Supply, Field Artillery Battalion	Artillery School
30-7	(FA) Meteorology for Light Aviation (for pilots only)	Artillery School
40-2	Rules of Land Warfare	Judge Advocate General
40-7	(FA) Staff Functions	Artillery School
40-7	(SC) Tactics of Seacoast Artillery	Artillery School
40-9	(FA) Supply in Combat	Artillery School
50-2	(FA) Division Artillery in Defensive Action	Artillery School
50-3	(FA) Corps and Army Artillery	Artillery School
INFANTRY SCHOOL		*Originating School*
20-2	Methods of Instruction	Infantry School
20-3	Military Law—Courts Martial	Judge Advocate General
20-4	Crew Served Infantry Weapons Not Self-Propelled	Infantry School
30-1	Administration II	Adjutant General's School
30-2	Training Management	Infantry School
30-3	Terrain Evaluation I	Infantry School
30-4	Preparation of a Field Exercise	Infantry School
40-1	Map and Aerial Photograph Reading III	Engineer School
40-2	Rules of Land Warfare	Judge Advocate General
40-10	Joint Air Ground Operations	Infantry School
50-1	Terrain Evaluation II	Infantry School
60-1	Tactical Use of Motor Vehicles	Infantry School
60-2	Development and Security of an Infantry Regiment in Defensive Combat	Infantry School
CHAPLAIN SCHOOL		*Originating School*
30-2	Leadership, Discipline, Courtesy and Customs of the Service	Ground General School
30-3	The Chaplain	Chaplain School
30-4	Administration I	Adjutant General's School
30-5	Organization and Administration of the Unit Chaplains Office	Chaplain School
30-6	Military Sanitation	Medical Field Service School
30-7	First Aid	Medical Field Service School

30-8	Map and Aerial Photograph Reading I	Engineer School
30-9	Burial, Graves Registration and Related Subjects	Chaplain School
30-10	Military Law—The Low of Military Offenses	Judge Advocate General
40-1	Administration II	Adjutant General's School
40-3	Rules of Land Warfare	Judge Advocate General
40-5	Counseling	Chaplain School
40-6	Signal Communications for all Arms and Services	Signal School
40-7	Military Law—Courts Martial	Judge Advocate General
40-8	Methods of Instruction	Infantry School
CHEMICAL CORPS SCHOOL		
10-3	Leadership, Discipline, Courtesy and Customs of the Service	*Originating School*
10-4	Military Sanitation	Ground General School
10-6	Military Law—The Law of Military Offenses	Medical Field Service School
10-7	Drill and Physical Training	Judge Advocate General
10-8	Map and Aerial Photograph Reading I	Ground General School
10-9	Interior Guard Duty	Engineer School
10-11	Individual Weapons	Ground General School
10-13	Administration I	Ground General School
20-1	Chemical Agents	Adjutant General's School
20-2	Chemical Material	Chemical Corps School
20-3	Methods of Instruction	Chemical Corps School
20-6	Military Law—Courts Martial	Infantry School
20-7	Matériel—4.2 inch Chemical Mortar	Judge Advocate General
20-17	M2 Mechanical Smoke Generators	Chemical Corps School
30-1	Administration II	Chemical Corps School
30-4	Chemical Mortar Company	Adjutant General's School
30-5	Chemical Corps Service Units	Chemical Corps School
30-25	Signal Communications for all Arms and Services	Chemical Corps School
40-1	Map and Aerial Photograph Reading III	Signal School
40-4	Rules of Land Warfare	Engineer School
40-6	Chemical Mortar Battalion I	Judge Advocate General
		Chemical Corps School
ENGINEER SCHOOL		
10-3	Leadership, Discipline, Courtesy and Customs of the Service	*Originating School*
10-4	Military Law—The Law of Military Offenses	Ground General School
10-5	Military Sanitation	Judge Advocate General
10-6	First Aid	Medical Field Service School
10-7	Administration I	Medical Field Service School
10-10	Interior Guard Duty	Adjutant General's School
10-11	Map and Aerial Photograph Reading I	Ground General School
10-17	Water Supply I	Engineer School
10-20	Explosives and Demolitions I	Engineer School
20-1	Military Law—Courts Martial	Engineer School
20-2	Methods of Instruction	Judge Advocate General
20-5	Engineer Reconnaissance I	Infantry School
20-6	Combat Principles for Engineer Units I	Engineer School
20-26	Signal Communications for all Arms and Services	Engineer School
30-1	Administration II	Signal School
30-3	Map and Aerial Photograph Reading III	Adjutant General's School
30-5	Engineer Staff Functions I	Engineer School
30-6	Water Supply II	Engineer School
40-1	Rules of Land Warfare	Engineer School
40-3	Water Supply III	Judge Advocate General
		Engineer School
FINANCE SCHOOL		
10-2	Leadership, Discipline, Courtesy and Customs of the Service	*Originating School*
10-3	Map and Aerial Photograph Reading I	Ground General School
10-4	Interior Guard Duty	Engineer School
10-5	Military Sanitation	Ground General School
10-6	First Aid	Medical Field Service School
10-8	Drill and Physical Training	Medical Field Service School
10-9	Military Law—The Law of Military Offenses	Ground General School
10-10	Administration I	Judge Advocate General
20-1	Methods of Instruction	Adjutant General's School
20-2	Military Law—Courts Martial	Infantry School
20-3	Organization of the Finance Department	Judge Advocate General
20-4	Introduction to Receipts and Disbursements of WD Funds	Finance School
20-5	Pay of Enlisted Personnel	Finance School
20-6	Pay of Officers	Finance School
20-7	Travel Allowance for Officers	Finance School
20-8	Travel Allowance for Enlisted and Civilian Personnel	Finance School
20-9	Processing Commercial Bills for Payment	Finance School
30-1	Public Funds	Finance School
30-2	Agent Officers	Finance School
30-3	Disbursing Officers Accounting Procedure	Finance School
30-4	Organizations and Functions of a Disbursing Office	Finance School
30-6	Administration II	Adjutant General's School
30-17	Signal Communication for all Arms and Services	Signal School
40-1	Fiscal Organization Responsibility	Finance School
40-2	Budgetary System of the War Dept.	Finance School
40-3	Army Banking Arrangements	Finance School
40-4	War Department Fiscal Code and its application	Finance School
40-5	Rules of Land Warfare	Judge Advocate General
40-6	Fiscal Accounting for Field Installations	Finance School
JUDGE ADVOCATE GENERAL		(Not accepting Students this School Year)
30-4	Military Law—The Law of Military Offenses	Judge Advocate General
30-5	Military Law—Courts Martial	Judge Advocate General
40-1	The Legal Assistance Program	Judge Advocate General
40-2	Rules of Land Warfare	Judge Advocate General
MEDICAL FIELD SERVICE SCHOOL		
10-3	Leadership, Discipline, Courtesy and Customs of the Service	*Originating School*
10-4	Administration I	Ground General School
10-5	Military Law—The Law of Military Offenses	Adjutant General's School
10-6	Map and Aerial Photograph Reading I	Judge Advocate General
10-7	Military Sanitation	Engineer School
10-8	Drill and Physical Training	Medical Field Service School
10-9	First Aid	Ground General School
10-11	Interior Guard Duty	Medical Field Service School
20-1	Methods of Instruction	Ground General School
20-2	Military Law—Courts Martial	Infantry School
20-13	Signal Communications for all Arms and Services	Judge Advocate General
30-1	Administration II	Signal School
30-3	Medical Records and Reports	Adjutant General's School
30-6	Training Management	Medical Field Service School
30-10	Orders	Medical Field Service School
40-1	Map and Aerial Photograph Reading III	Adjutant General's School
40-5	Rules of Land Warfare	Engineer School
		Judge Advocate General
ORDNANCE SCHOOL		
10-2	Leadership, Discipline, Courtesy and Customs of the Service	*Originating School*
10-3	Military Law—The Law of Military Offenses	Ground General School
10-4	Administration I	Judge Advocate General
10-6	Military Sanitation	Adjutant General's School
10-7	First Aid	Medical Field Service School
10-8	Interior Guard Duty	Medical Field Service School
10-9	Map and Aerial Photograph Reading I	Ground General School
20-1	Methods of Instruction	Engineer School
20-5	Military Law—Courts Martial	Infantry School
20-7	Signal Communications for all Arms and Services	Judge Advocate General
30-4b	Fundamentals of Optics	Signal School
30-4c	Technical Ammunition Part I	Ordnance School
40-1	Map & Aerial Photograph Reading III	Ordnance School
40-11	Rules of Land Warfare	Engineer School
		Judge Advocate General
MILITARY POLICE SCHOOL		
10-2	Leadership, Discipline, Courtesy and Customs of the Service	*Originating School*
10-4	Interior Guard Duty	Ground General School
10-5	Map and Aerial Photograph Reading I	Ground General School
10-6	Military Sanitation	Engineer School
10-7	First Aid	Medical Field Service School
10-8	Administration I	Medical Field Service School
10-12	Military Law—The Law of Military Offenses	Adjutant General's School
10-13	Drill and Physical Training	Judge Advocate General
10-14	Individual Weapons	Ground General School
20-6	Methods of Instruction	Ground General School
20-7	Military Law—Courts Martial	Infantry School
20-8	Domestic Disturbances	Judge Advocate General
20-11	Town Patrolling	Military Police School
30-2	Interpretation of T/O&E	Military Police School
30-3	Administration II	Military Police School
30-4	Training Management	Adjutant General's School
30-6	Prisoners of War	Military Police School
30-7	Duties and Functions of a Provost Marshal	Military Police School
30-11	Investigative Technique	Military Police School
40-1	Map and Aerial Photograph Reading III	Engineer School
40-2	Rules of Land Warfare	Judge Advocate General
40-3	Prisoner of War Camps	Military Police School
40-5	Civilian Evacuation and Control of Stragglers	Military Police School
QUARTERMASTER SCHOOL		
10-2	Leadership, Discipline, Courtesy and Customs of the Service	*Originating School*
10-3	Military Law—The Law of Military Offenses	Ground General School
10-4	Administration I	Judge Advocate General
10-5	Interior Guard Duty	Adjutant General's School
10-6	Map and Aerial Photograph Reading I	Ground General School
10-9	Military Sanitation	Engineer School
10-10	First Aid	Medical Field Service School
20-1	Methods of Instruction	Medical Field Service School
20-7	Property Accountability and Responsibility	Infantry School
20-16	Military Law—Courts Martial	Quartermaster School
30-3	Administration II	Judge Advocate General
30-6	Commercial Accounting Part A	Adjutant General's School
40-1	Rules of Land Warfare	Quartermaster School
40-3	Map and Aerial Photograph Reading III	Judge Advocate General
		Engineer School
SIGNAL SCHOOL		
10-2	Leadership, Discipline, Courtesy and Customs of the Service	*Originating School*
10-3	Map and Aerial Photograph Reading I	Ground General School
10-4	First Aid	Engineer School
10-5	Military Sanitation	Medical Field Service School
10-6	Military Law—The Law of Military Offenses	Medical Field Service School
10-7	Signal Communication for all Arms and Services	Judge Advocate General
10-8	Administration I	Signal School
10-9	Interior Guard Duty	Adjutant General's School
20-2	Methods of Instruction	Ground General School
20-3	Field Radio Communication Fundamentals	Infantry School
		Signal School

20-4	Field Wire Communication Fundamentals	Signal School
20-5	Military Law—Courts Martial	Judge Advocate General
20-9	Field Wire Communication Matériel	Signal School
20-10	Field Radio Communication Matériel	Signal School
20-14	Basic Radar	Signal School
30-1	Administration II	Adjutant General's School
30-4	Signal Orders	Signal School
30-5	Technical Wire Communications—Principles of Field Equipment	Signal School
30-8	Organization and Signal Communication of the Corps	Signal School
30-10	Technical Radio Communication—Principles of Field Equipment	Signal School
30-14	Radio Relay Equipment FM	Signal School
30-15	Radio Relay Equipment Pulse Modulated	Signal School
30-50	Radar System Survey I	Signal School
40-1	Rules of Land Warfare	Judge Advocate General
40-3	Map and Aerial Photograph Reading III	Engineer School
40-12	Signal Corps Staff Duties	Signal School

THE ADJUTANT GENERAL'S SCHOOL

Originating School

10-2	Leadership, Discipline, Courtesy and Customs of the Service	Ground General School
10-3	Military Law—The Law of Military Offenses	Judge Advocate General
10-4	Administration I	Adjutant General's School
10-5	Map and Aerial Photograph Reading I	Engineer School
10-6	Military Sanitation	Medical Field Service School
10-7	Interior Guard Duty	Ground General School
10-11	Signal Communications for all Arms and Services	Signal School
10-12	First Aid	Medical Field Service School
10-15	Drill and Physical Training	Ground General School
20-1	Methods of Instruction	Infantry School
20-2	Military Law—Courts Martial	Judge Advocate General
20-11	Individual Weapons	Infantry School
20-12	Crew Served Infantry Weapons Not Self-Propelled	Infantry School
30-2	Orders	Adjutant General's School
30-3	Administration II	Adjutant General's School
30-14	Training Management	Infantry School
40-6	Rules of Land Warfare	Judge Advocate General
40-8	Map and Aerial Photograph Reading III	Engineer School

TRANSPORTATION SCHOOL

Originating School

10-2	Leadership, Discipline, Courtesy and Customs of the Service	Ground General School
10-3	Man and Aerial Photograph Reading I	Engineer School
10-4	Interior Guard Duty	Ground General School
10-5	Military Sanitation	Medical Field Service School
10-6	First Aid	Medical Field Service School
10-10	Military Law—The Law of Military Offenses	Judge Advocate General
10-11	Administration I	Adjutant General's School
10-13	Drill and Physical Training	Ground General School
20-2	Methods of Instruction	Infantry School
20-3	Military Law—Courts Martial	Judge Advocate General
20-5	Depot Storage Operations	Transportation School
20-6	Port Company Stevedoring and Operations	Transportation School
20-7	Signal Communications for all Arms and Services	Signal School
20-8	Truck Driver Selection, Training and Discipline	Transportation School
20-15	Ship Transportation Officer	Transportation School
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30-1	Administration II	Adjutant General's School
30-3	Troop Movement Through Port of Embarkation	Transportation School
30-5	Transportation Services ZI	Transportation School
30-6	Stevedore Operations	Transportation School
30-8	Organizations and Operation of Staging Areas	Transportation School
30-9	Administration of Transports	Transportation School
30-19	Military Freight Movements	Transportation School
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THE POWER BEHIND THE ROCKET

*by Ivor B. N. Evans**

A British writer here discusses rockets and their possibilities from the British point-of-view. The British Government's Rocket Propulsion Department is taking shape on a former Royal Air Force airfield near the village of Westcott in Buckinghamshire, England. This Department is the center for research and development on every type of rocket propulsion system and unit, for Britain and the Commonwealth. The progress at Westcott, according to the author, is promising and the constructional work is going ahead very rapidly.

ON a former Royal Air Force airfield, situated in the midst of quiet green pleasant fields near the village of Westcott in Buckinghamshire, England, buildings are rising and work is being done, which will have a decisive influence on not only British aviation, but the world's. The British Government's Rocket Propulsion Department is taking definite shape.

The Department is the center for research and development on every type of rocket propulsion system and unit, for Britain and the Commonwealth. The testing is done statically on test beds; the actual flying tests being done at various ranges in isolated parts of Britain, particularly Aberporth, in Wales, and on the new range in Australia.

Recently visitors were allowed to see over the station for the first time since it was founded in April 1946. Naturally a certain amount of secrecy is being kept regarding British lines of development; but, I was told, cordial relations exist between the American and British authorities concerned. In some aspects the U.S.A. is ahead, while in other methods Britain leads.

Westcott Rocket Propulsion Department is designed for studying the power behind the rocket only; the aerodynamic, electrical and other work is done at other research stations.

One of the possible useful applications for rockets is the assisted take-off of aircraft and the motor unit of the German rocket interceptor aircraft, the Me.163 is being carefully studied. This unit, weighing only 400 lbs, develops up to 8,000 H.P. or more than twice the capacity of the Merlin engine. It shoots the interceptor aircraft through the air, at an angle of 45° to a height of 30,000 feet in three minutes. During its four-minute run it burns three tons of fuel; but the aircraft by gliding, remains in the air for another fifteen minutes or so.

The unit is clamped to its test bed, with its blast walls, observers watch from behind a concrete barrier; there is a flabby flag or flame from the combustion chamber opening, which suddenly develops into a terrific roar. The earth shakes, one's head is almost numbed and the fierce jet of flaming, rushing gases mows down the grass a hundred yards away.

The gases issue at a speed of several thousand miles an hour and the jet, less than a foot in diameter, has a thrust of two tons. The fearsome jet is controllable and the supersonic shock waves can be seen as dark bands in the flame. The temperature inside the combustion chamber is between 2,000° and 3,000°C. In the air the unit is specially cooled; on the test beds it is cooled

*Author of *Rutherford of Nelson* and other books; Member of the Association of British Science Writers.

with water circulating at high pressure.

The greatest problems are those concerning heat transfer; they are the barriers hindering the development of more efficient units.

Dr. Johannes Schmidt, who was formerly in charge of the rocket works at the Walterwerke, Kiel, and was largely responsible for the development of the Me.163 unit, heads the German team working in conjunction with the British chemists, engineers, mathematicians, physicists, draughtsmen and mechanics. I was told that if the Germans had devoted one-tenth of their effort used on projectiles like the V-2, to the development of rocket-propelled aircraft, then they might have had a good chance of winning the war.

The fuels considered include cordite, gasoline, kerosene, various hydrocarbons such as hydrazine hydrate and their oxidants, such as liquid oxygen, nitric acid and hydrogen peroxide. Combustion kinetics, fuel supply methods—by compressed gases, pumps or turbines—heat transfer problems and special materials, comprise the main fields for investigation.

In a large building called "the Museum" is an almost complete range of the German rockets developed during the war. Many only reached the experimental stage because of inherent faults and difficulties encountered; but a few were out into production particularly the V-2. Yet, when the V-2 is seen in section, with its huge fuel tanks, great casing, turbines, pumps and control compartment, one behind the other, necessary to transport a comparatively insignificant amount of explosive in the warhead, it appears obvious that later German efforts were directed toward very much smaller, less costly and more effective projectiles. Fortunately the war ended before these went into production.

The Germans used a mixture of methyl alcohol and hydrazine hydrate, with a little potassium cuprocyanide as a catalyst, as the basis of their "C-Stoff" and "T-Stoff" fuels, and hydrogen peroxide as the oxidant. The peroxide is pure hydrogen peroxide, on contact with many organic materials, such as, for example, newsprint, it bursts into flame. The drawback of the present type of motor unit is that the whole system must be thoroughly washed out after every operation, because stray drops of hydrogen peroxide may wander and meet drops of fuel, thus causing an explosion.

"We must expect an explosion now and again," said one of the staff. The new test beds, which will be finished by the autumn, have been planned very carefully. The ducts for the exhaust gases have been constructed so that they may be flooded, immediately from high-pressure water mains, in an emergency. Control and observation chambers are of reinforced concrete, with narrow windows glazed with armor glass. High-pressure nitrogen, at one thousand to one hundred pounds per square inch, is on tap for feeding fuels. Consumption is at the rate of two or more gallons per second.

When the propulsion unit is clamped down, the recording instruments will be attached. Some will be recorded in the Control room and others will be electronic measurements recorded in a central building far enough away not to be disturbed by vibrations. More than thirty measurements of thrusts, pressures, temperatures, rates of flow and so forth, will be recorded at one time, while high-speed cinematograph records, at the rate of 3,000 frames per second, will also be made.

All this is necessary because what goes wrong in perhaps only one-thousandth of a second may be the cause of an explosion. In that almost incomprehensibly short space of time the gases will have moved seven feet on their journey from the combustion chamber.

One of the completed units is the supersonic wind tunnel for observation of the behavior of bodies, such as parts of a combustion chamber, in air moving at one thousand miles an hour. On one side of a wall is a large "powerhouse" with the whirling pumps screaming at ear-shattering pitch. On the other is the long wind tunnel, just about six inches by four and a half in section. When air rushes through at supersonic speeds all is quiet, because the scream of the pumps is no longer transmitted along the tunnel. The air is too fast for the sound waves and sweeps them back. The tunnel has been specially designed and constructed by the Westcott staff.

One of the possible uses for rockets would be transporting mail across, say the Atlantic. However, as yet, there are two great obstacles. The accuracy of control in flight makes the problem of landing difficult at ranges of thousands of miles, while the landing ground, or target, must be very large. There are also the problems of rise in skin temperature. The casing of the V-2 became red hot during its travel from Germany.

These problems are comparatively easier with regard to the more important meteorological applications such as have been made in New Mexico, where the rocket travels straight up and down. The limiting factor for profitable use is the cost of running, because the fuels are more expensive than gasoline, and the consumption rate enormous.

In spite of the German work, rocket propulsion is still in its infancy and one of the limiting problems is the question of discovering the right alloys that can stand the terrific temperatures, and the best all-round and safe fuel.

The crew of an aircraft assisted into the air by a take-off rocket unit are not going to feel happy if there is danger of an explosion.

Mathematicians apparently find that supersonic conditions are more amenable to mathematics than the subsonic, so that, from the development engineer's point of view, the behaviors calculated will be very near the behavior to be experienced in practice. This, as test pilots well know, is not so with ordinary aircraft.

The progress at Westcott is promising and the constructional work is going ahead rapidly. Shortly Britain will be well equipped to maintain development in this new form of propulsion, which has yet to yield up its major secrets.

Exercise Longstop

*by Charles Gardner**

A veteran British newspaperman describes in this article the biggest airborne exercise held in Britain since the end of the war. Some 2,400 men with arms, and 170 tons of equipment and supplies were given airlift in the operation. The operation, which used several American aircraft, came off a complete success.

"EXERCISE LONGSTOP" was the biggest airborne exercise held in Britain since the war—and by far the most spectacular. It lasted over most of two days (September 22 and 23) and altogether it employed 68 Dakotas (C-47's), 10 Halifax bombers, 20 York transports, 12 Horsa gliders and nine Hamilcar gliders. The troops used were the 2nd Parachute Brigade Group of which two battalions were dropped (or supposed to be) and one was landed. Altogether 2,400 men with arms, and 170 tons of equipment and supplies were given airlift.

All the aircraft were supplied by Nos. 4, 38 and 46 Groups of RAF Transport Command, under Air Vice-Marshal A. L. Fiddament, and the airborne troops were commanded by Brigadier R. H. Bellamy.

The large and expansive audience included the Chief Imperial General Staff (Lord Montgomery), the Chief of the Air Staff (Lord Tedder), the retiring A.O.C. in C. Transport Command (Air Marshal Sir Ralph Cochrane, who has now taken over the RAF's Technical Training) and the full military and Air Attache strength of the diplomatic corps.

So much for the preliminaries—now for the action.

The "plot" was that Netheravon airfield on Salisbury Plain, England, was supposed to be a grass airfield some 200 miles inside enemy territory. It was held by a garrison of two companies of infantry, and some light Ack-Ack. Forty miles away were two infantry battalions, one squadron of armored cars and one composite squadron of obsolete light and medium tanks. Communications were poor and the country undeveloped.

All these, I think, were fair assumptions of conditions which one could well expect to find 200 miles back from the lines—especially when the initiative of choice of target is in the hands of the attacking force—as must always be with an airborne swoop.

The attack was due to start at 1730 hours on September 22. One C-47 left Abingdon near Oxford with a stick of pathfinder parachute troops, equipped with Dropping Zone homing aids, mainly radar, but with smoke signals and white D.Z. markers. They were to drop half-an-hour before the main force and home the leaders to the D.Z. In actual fact a 20/28-mile-an-hour wind was blowing on the evening of September 22 and when the Dakota arrived over the D.Z. at 1730 precisely—it was warned off by red Very lights as the men might have been dangerously dragged by the wind.

Half-Hour Loading

Meanwhile the main Dakota force of 48 aircraft (4 Squadrons) carrying a battalion Group of 850 men and equipment—plus two 350-pound containers of equipment per aircraft had already taken off from Abingdon and were out on a 200-mile circular approach to Netheravon to simulate the penetration of enemy territory. There was an assumed escort of fighters and ground strafing aircraft, plus a diversion by medium and heavy bombers on communications in the target area.

The loading of the 48 Dakotas was concisely organized, the Army providing one numbered truck to each of the numbered aircraft. The trucks contained

*Air Correspondent to the British Broadcasting Corporation, who served with the RAF during the war.

exact loads, and drove round the perimeter track and along the lines of aircraft until they were opposite the appropriately numbered C-47. The loading then took place and lasted, all told, about 30 minutes.

Each aircraft carried between 15 to 18 equipped troops, and two supply containers, plus an RAF jump-assistant, or despatcher.

The take-off was all done from one runway, and all 48 aircraft were airborne in five minutes. The system used was that of bringing the aircraft to the mouth of the runway in two converging streams forming an inverted Y. I was flying in the leading aircraft and we had 18 troops under a "stick" Commander, a major. He had done 12 previous jumps and his men averaged about 15 jumps. Many of them were volunteers from the age-group call-up, and appeared unworried at the prospect of "going through the hole" in a seemingly strong wind. All the men had been tactically briefed on the D.Z. and the subsequent dispositions and company rallying points. The vital equipment loads and the senior officers were dispersed and, in the case of equipment, duplicated, at scattered points in the formation.

We, in the leading aircraft, had the main navigational work—although each machine was, in fact, keeping its own nav-plot going "just in case." Split-second timing was called for, and was achieved throughout and the run up to the D.Z., which was a field four miles from the actual airfield, was made within 15 seconds of E.T.A. The Dakotas formation was a simple one of four V's of three per squadron, with an interval of 15 seconds between V's and 30 seconds between squadrons—the whole stream extending over several miles of sky.

Unfortunately the expected evening drop of wind velocity didn't materialize, and so, like the pathfinder force, our main body was unable to drop, and the whole gaggle had to return to Abingdon, landing back at last light in a total of about 18 minutes.

This meant that the whole D-1 program had failed to take place, but the motto was "The exercise goes on," and on D-Day it was assumed that the first drop had taken place, and that the troops had overwhelmed the two defense companies and now held the perimeter of Netheravon. This was also a reasonable assumption, as the D.Z. was lonely farm land, and the drop would have been unlikely to meet any more rugged immediate opposition than a farmer and a shotgun.

The Drop Takes Place

D-Day therefore was really a re-inforcement and consolidation operation while the offensive air arm was denying reinforcement to the enemy. I note here a basic assumption of air supremacy which is the obvious prerequisite of an airborne attack. Either that, or, as in the actual and similar Wingate operations in Burma—lack of enemy air activity in the area at all.

On D-Day the wind was still high (15 m.p.h. gusting to 18 m.p.h.), but the drop took place. The same 48 Dakotas again arrived dead on the second, and cascaded on to the now "British" airfield, some 900 troops and supplies. The drop was from 650 feet at a constant airspeed of 90 knots, and the men marched through the doorways hands at sides, right foot first—literally stepping into space by numbers. The jump-assistants (RAF NCO's, some of whom had anything up to 200 jumps) were in charge of the actual exit arrangements.

By my watch the elapsed time from first man out to last man out was nine minutes and by 13½ minutes the supply canisters, with their pastel colored parachutes, had been rounded up, and the men were being deployed. Overlapping this deployment (in fact 1 minute after the last man had jumped), 10 Halifaxes came over and pushed out two troops of guns and jeeps with gun crews and ammunition. Incidentally I should have mentioned that the original D-1 drop, had it taken place, would have been followed by four jeeps and two trailers dropped from three Halifaxes.

So far—so good. Two battalions were now holding the airfield, plus two guns and an assortment of jeeps.

Next reinforcement was 20 minutes later, when 12 Horsa and six Hamilcar gliders arrived on Halifax and Dakota tow.

They made for a cleared area of the field, and were landed with precision by Officers and NCO pilots of the Glider Pilot Regiment. They were all down in 15 minutes—and they all finished their landing runs in perfect "unloading" formation. The gliders brought heavy airfield construction equipment on the assumption that the airfield had been "demolished" by its defenders. One of the gliders, a C.G4A, was, incidentally, promptly filled with "important prisoners" and snatched off by a Dakota, and an assortment of Sikorsky helicopters arrived carrying staff officers.

After this there followed a "theoretical" elapse of eight to 12 hours while the construction troops repaired a landing strip suitable for Dakotas, and while the two battalions (plus any further airborne reinforcements) still held the area against an air-harassed enemy.

At the end of this time six Dakotas arrived; landed, and disgorged the heavy equipment of the third battalion, which followed on five minutes later, carried in the ubiquitous 48 Dakotas. The streaming and landing of these troops took 30 minutes, and they were really a "token" of almost unlimited reinforcements which could now be flown in and de-planed.

That virtually ended the exercise, except for a demonstration of an RAF Mobile Staging Post and an Army Forward Air Supply Organization Unit in "action" at another airfield, Brize Norton in Oxfordshire. Unfortunately the USAF radio-controlled Skymaster (C-54) had also just landed at Brize Norton.

Those who watched the RAF demonstration saw 20 Yorks arrive with equipment which covered everything from Army workshops to a medical setup and troops' mail.

Of the 900 men actually dropped in a comparatively high wind only six sustained any injuries at all and none of them were any more serious than sprains.

What Of The Cavalry?*

by Captain Fergus N. Fitz Gerald

THERE exists here (Ireland) no manual of cavalry tactics and as a result many people who would otherwise have the interest to discover at least what are the basic roles of this corps are compelled to remain in ignorance. It is true that in other countries where manuals have been duly approved and issued there is almost as much ignorance on the subject, for it is found that not alone infantrymen, but even cavalrymen themselves, frequently misunderstand the duties and capabilities of the service.

Cavalry missions are unchanging; what was true of Hannibal's horse at *Cannae* was true of Montgomery's armor at *Alamein* more than 21 centuries later. In other arms new weapons bring new methods, but cavalry tactics remain unaltered, even though the horse has been replaced today in most armies by the tank, the armored car and the scout car.

Cavalry missions fall into two main groups—*battle roles* and *auxiliary roles*. Curiously, the auxiliary roles are more important than the battle roles. There is a considerable amount of disagreement in most armies concerning the amalgamation of the groups of roles, some experts holding that the same units can fulfill both and others insisting that they cannot. F/M Montgomery, for instance, adheres strongly to the former belief (as do most American commanders), whereas General Martel, late commander of the Royal Armored Corps, argues that Montgomery's method resulted in delays, large casualty lists and frequent reverses for the British during the years 1942-45. The attitude of cavalry officers in this country is rather in support of Martel than of Montgomery, but no definite theory has as yet been formulated.

The *battle roles* are less important than the auxiliary roles, but nevertheless they require some explanation. These battle roles are based upon the characteristics of cavalry—the ability to maneuver and charge. The "charge" is known as *shock action*.

An attacking army advances until it is halted by the defender. To continue the advance it must remove the obstructing defense. If it cannot do this by mere weight of numbers (which in any event is an uneconomical method) it must do it by maneuver and shock. The cavalry can maneuver, and on account of its armor it can advance into fire. Furthermore, it can sustain its advance longer than the infantry, who must halt and reorganize after each short gain.

However, a frontal attack, even by armored cavalry, is far less effective than a flank attack, and if the enemy is prepared the frontal attack may be easily dispersed.

For this reason the cavalry attack is always applied to a flank. In position warfare, where the defender has had time to establish himself and extend his wings, it is often impossible to find an open flank; continuous lines, such as on the Western Front in 1914-18, are the infantry answer to the threat of the cavalry. Where there are no open flanks for the cavalry to turn, and therefore where maneuver is impossible, one of two alternatives remains—either to make a series of frontal drives, each having a limited objective (these were the tactics on the Western Front in World War I) or else flanks must be created forcibly by concentrated frontal attack, by ruse, or by some other method.

In 1940 there appeared to be no open flank on the "Maginot" Front, but the Germans detected that the Ardennes were not defended and made their main effort through this region. In 1941 the defenses of Crete were extended indefinitely by the British Navy in the Mediterranean; the Germans found an unguarded flank in the air and by airborne landings captured the island. At Alamein in 1942 Montgomery was obliged to create a gap in a flankless line by skillful use of artillery and hard slogging by the infantry; only when the gap was secured did the armor go into action. In Normandy in 1944 the British feint against Falaise drew

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the Germans from the St. Lô sector, opening the way for Patton's Third U.S. Army to break out and turn the flank of the defenders. These examples are drawn from the "big picture," but in a smaller way lesser formations and individual units employ the same methods for creating flanks which the cavalry then turn and roll up.

The actual tactics of shock—that is, of the cavalry "charge"—are similar to the infantry tactics (the bayonet charge, for instance) but are carried out on a far grander scale. The charge is brought about, individually, by spurring the horse or revving the engine; time has not altered the means. The same rules apply to a cavalry charge as to an infantry assault, alignment must be kept, reorganization conducted, and so on. But cavalry can both cover a wider area and penetrate to a greater depth than infantry because of its mobility. However, cavalry has a number of limitations. It can win ground but cannot hold it or take prisoners. Nor can it exert pressure once its momentum is exhausted or halted. For these reasons cavalry cannot operate for long without infantry support.

The auxiliary roles of cavalry are various. First comes *security*. A force advancing toward an objective automatically assumes the form of a column, and accordingly has open flanks which can be threatened by the enemy. Cavalry is given the mission of covering these flanks. This is done by moving on parallel routes to the main body, remaining always sufficiently near to avoid the danger of the enemy infiltrating between the cavalry and the column, and yet keeping far enough away from the infantry to insure that a clash with a hostile force will not spread to include and hamper those who are being protected. The flank guard usually advances in bounds from objective to objective. Being mobile, cavalry flank guards can halt and deploy as required without falling behind the main force.

A frequently neglected rule with regard to flank protection is that the cavalry command must not under any circumstances be split; that is, one formation cannot cover both flanks at once. The commander must be responsible only for the troops he can control, and he has no control of subunits separated from him by the infantry column.

In defense, cavalry is often given a similar security role of defending the open flank. Mobility permits the cavalry to cover a wider front than infantry and observe any threat to the defender's wing.

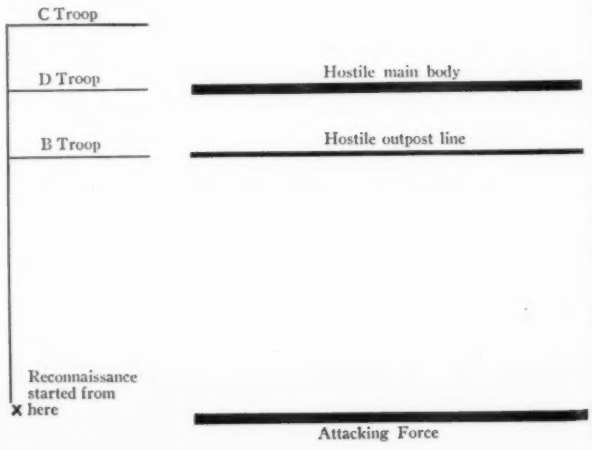
A third security role is that of screening infantry, either on the march or in defense. On the march the cavalry advances before the infantry, much in the same method as when on flank guard, clearing away small parties of enemy and preventing attack upon the main body. If the hostile elements become too strong for the cavalry it must call upon the infantry for support, and battle develops.

Before a defending or halted force cavalry forms an outpost line, its mission being to delay the enemy and cover and warn the defending infantry. Again the mobility of the cavalry serves as an advantage, for it can fall back with rapidity. Similarly, cavalry acts as a rear guard for retiring troops, or fights a delaying action.

Another mission given to cavalry is that of *exploitation and pursuit*. When the enemy is defeated and is falling back the victorious infantry cannot maintain contact, for retreat is more rapid than even a victorious advance. It is the cavalry, therefore, which exploits the breach made in the hostile line by the withdrawal of the defeated elements and pursues them. Pursuit in practice generally takes the form of a number of small actions with the hostile rear guard, but under ideal conditions it may be possible to by-pass the rear guard and hit the main forces. In 1941 the Italians, driven from Sidi Barrani, fell back along the Libyan coast. Elements of the British 7th Armored Division cut across the desert to *Beda Fomm*, outmaneuvering the Italian rear guards, and caught the head of the retreating army in ambush. The disorganization thus created was so great that within a few hours 26,000 Italians surrendered and General Bergonzoli's army was virtually annihilated.

The most difficult cavalry task is that of *reconnaissance*. The commander issuing the orders for reconnaissance (that is, the brigadier, divisional or army commander) in practice rarely gives clear and precise instructions about the type of information required, with the result that the cavalry commander is left uncertain as to his exact mission and fails to accomplish it. Reconnaissance orders should be simple, brief and clear and should include not only "what is to be found out," but also "by what time must the mission be completed." General orders requesting the cavalry leader to search broad areas or "reconnoiter to the front" are quite worthless.

Reconnaissance and security missions cannot under any circumstances be combined. A cavalry force on flank guard or screen duties should never be given a secondary task of reconnoitering, for the two roles are contrary. A security mission implies that the cavalry carrying it out is tied to the body which it protects, whereas reconnaissance must be conducted with com-



parative independence from all other formations. Nor should two separate reconnaissance tasks be given to the same cavalry formation.

Reconnaissance missions may vary considerably, so that no general rules regarding the methods of their conduct can be laid down. However, once the mission and time limit are given, the means of accomplishing the task are usually fairly clear. An example of such a mission, which occurred in actual combat, was a request to a cavalry commander to locate the flank of a strong hostile rear guard. The cavalry leader was told the approximate position of the enemy front, and given the information (obtained from earlier patrols) that the hostile line reached as far as a certain point but definitely did not extend to another point. Clearly, the flank which was sought lay between these two points. The cavalry commander issued orders to his subunits to advance on the point where the enemy *was not,* and then instructed them at intervals to turn in toward the enemy. The result was that B Troop took the hostile outpost line in flank, D Troop turned the wing of the main defenses, and C Troop came in the rear of the enemy. The flank was located and surrounded. The cavalry lacked the weapon power to do more than hold isolated defensive positions, but by maintaining contact with the enemy for the whole period the cavalry commander was able to direct the infantry units into the attack. The hostile flank was rolled up by the infantry and the position captured.

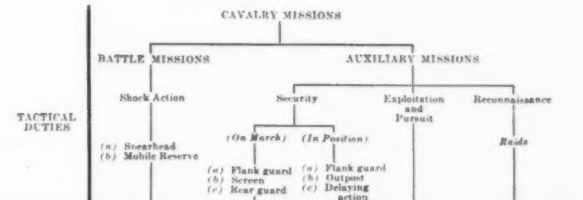
It is unnecessary to add that information from reconnaissance must be complete, prompt and continuous, and that contact with the enemy must not be lost.

Raiding missions are also given to cavalry units chiefly for the purpose of harassing the enemy and gaining information about him. The conduct of raids is mainly similar to the conduct of normal reconnaissance tasks, but where the raiders have to penetrate into hostile territory they must naturally be given complete independence of action. A typical example of a raid—as typical today as when it was carried out—is Sarsfield's attack upon the Williamite artillery train at *Ballineety* in 1690.

At the outset of this article it was mentioned that there is considerable disagreement on the subject of the types of mechanized cavalry units required for the various missions. The battle roles demand heavy armor, the auxiliary roles lighter and more mobile forces. The British organization, developed by General Martel and nominally maintained during the greater part of World War II, provided Armored Divisions of cruiser tanks (British *Crusaders* and *Cromwells* and U.S. *Shermans*), together with an infantry brigade, self-propelled artillery, and engineer and supply services, for auxiliary roles; the battle roles were given to Army Tank Brigades equipped with *Matilda* and *Churchill* "Infantry" tanks. Experience showed, however, that it was almost impossible in actual operations to make available the type of formation designed for the mission in hands; in battle often only Armored Divisions were ready to go into action, for pursuit the Army Tank Brigades frequently had to be employed. As a result, F/M Montgomery abandoned the idea of maintaining separate establishments, but Martel and his supporters are severely critical of Montgomery's method, holding that a few Army Tank Brigades properly employed would have prevented the heavy losses of armor in the battles of *Alamein* and *Caen*.

For security roles flank and rear guards, screening and outposts, and for exploitation, mobile armor with mechanized infantry support is generally used, while for reconnassance armored cars and scout cars, with light and medium tanks to add weight and fire power, are most effective. Raiding operations require very light forces—the Cyclist Squadrons which we raised during the years 1940-45 were ideal for such tasks.

A "genealogy" of cavalry missions and the types of formations best suited to accomplish them would read something as follows:



That the missions of cavalry are not clearly understood, even by commanders experienced in action, is shown by Major Hal D. Steward in an article in the May-June, 1946, number of the ARMORED CAVALRY JOURNAL. He analyzes the types of missions assigned to 12 U.S. light mechanized cavalry formations (not including Armored Divisions, which during World War II were not treated as "cavalry" in the U.S. Army) with the following results:

Defensive Combat	33%
Special Operations	29%
Security	25%
Offensive Combat	10%
Reconnaissance	3%

For defensive and offensive combat, and no doubt also for many of the "special operations," infantry formations would have been far more effective than cavalry. Accordingly, the U.S. cavalry was wasted in at least 50 per cent of the operations in which it took part.

It is told of machine-gun officers during World War I that whenever they asked the battalion commanders to whom they were attached what they should do with their guns, the reply was, *"Go out on a flank and lose them."* In less than 20 years, however, commanders learned how to employ machine guns, but after 20 centuries they have still to discover the capabilities of cavalry.

Polish Armored Cavalry In Germany*

Translated and digested by the *Military Review* from an article by Major T. A. Wysocki in *Bellona* (Publication of Polish General Staff, London), July, 1946.

AFTER a five-month period of static operations on the Meuse in Holland, the Polish 1st Armored Division crossed into Germany and began operations in the direction of the Frisian Peninsula. The 10th Brigade of Armored Cavalry, a part of this division, covered 240 kilometers in a forced march on the 8th and 9th of April. The Rhine was crossed on a ponton bridge midway between Arnhem and the Ruhr basin. After the crossing, the Division moved northward along the German-Dutch frontier, going into action in the flat, marshy terrain north of the main highway connecting Arnhem, Lingen and Bremen.

On the 10th, the Division made contact with the enemy, between the Canadian 2d Division on the left and the Canadian 4th Armored Division on the right. The 10th Brigade of Armored Cavalry, passing through Enter, Rijssen and Almelo, reached the concentration area north of Balderhaar.

The composition of the brigade was as follows: 1st Armored Regiment; 24th Regiment of Uhlans (an armored regiment); the 9th Infantry Battalion; the 1st Battalion of the 1st Regiment of Antiaircraft Artillery; 10th Light Medical Company (less three detachments), and an armored repair detachment.

The brigade was operating without the 10th Regiment of Dragoons, which was already in action under the division as a detached unit and likewise without the 2d Armored Regiment which was operating with the 3d Rifle Brigade.

On April 10, the brigade received its mission to cross the river Ems on April 12, and go into action in the direction of Papenburg and Leer. The mission of forcing the river fell to the 9th Rifle Battalion. Enemy resistance proved so weak that this formation easily fulfilled its mission with but a part of its forces. On April 13, the 10th Company of Engineers constructed a bridge at Haren. The following day the brigade crossed the river without combat and continued northward on the highway along the river.

Forcing the Küsten Canal

The bridge across the Küsten Canal on the highway leading to Papenburg had been destroyed. It became obvious that the enemy was consolidating his positions on the northern bank over the whole of the brigade's zone of action. All attempts at crossing by reconnaissance patrols were decisively repulsed by enemy fire.

The brigade halted in the concentration area on both sides of the highway, north of Becklusen, and remained there till April 20.

The brigade had now reached a barrier which blocked entrance to the Frisian Peninsula and two important sea bases, Emden and Wilhelmshaven. This barrier included the Küsten Canal and the belt of marshy terrain and peat bogs lying on the north and south sides of it.

The brigade commander decided to conduct the attack along the highway. The zone of attack was bounded on the east by an unnamed canal running in a north-south direction, and on the west by the Ems river, which flowed along the border of the zone. The width of the sector was three kilometers, increasing gradually until it attained four kilometers at a point opposite the city of Aschendorf. The water obstacle, at the point of crossing, was twenty-five to thirty meters wide. The terrain in the immediate vicinity of the highway and the railroad was suitable for use by tanks, but some roads proved to be too soft, in many places, for Sherman tanks.

The enemy detachments fighting against the brigade were composed of various elements hurriedly combined into combat groups. They showed a decided resistance, although they were not properly equipped with weapons. They effectively demolished roads and bridges, using air bombs buried in the ground. A 500-pound bomb produced a crater 15 meters wide which soon filled with water. This proved to be an obstacle which could not be avoided, owing to the marshy terrain.

The brigade was opposed by the "Gericke" combat group, operating in conjunction with the 7th Parachute Division. Numerically, this group corresponded to one weak regiment (of three battalions), but it was extremely valiant and stubborn in defense. There had been a scarcity of information concerning the enemy because the terrain in the direction of the brigade's attack was a natural fortress, surrounded by water, which had not yielded a single prisoner.

Fighting was still going on on the west side of the river, and on the day the brigade arrived in the concentration area, enemy elements were still to be found south of the brigade's point of debarkation.

On April 14, at 4:30 p.m., a rifle battalion attempted to cross the canal, but failed. The brigade commander decided to repeat the attempt during the night April 14-15, but this also failed.

During the next few days the brigade was reinforced, and on April 18, the day before the attack was to be

**Military Review*, October, 1947.

renewed, it was composed of the following: 1st Armored Regiment; 24th Regiment of Uhlans; 1st Tatra Rifle Battalion; 9th Rifle Battalion; 4.2-inch Mortar Platoon; 10th Company of Engineers; one platoon of the 11th Company of Engineers; 10th Medical Company; Advanced Repair Detachment from the repair company of the Armored Brigade; one squadron of "Crocodile" flame throwers (British); mortar combat section.

In direct support was the 1st Regiment of Motorized Artillery, and in addition, air support adequate to insure air superiority at the time of crossing and the following day.

The mission remained unchanged; the crossing of the Küsten Canal and the taking of Papenburg.

The main plan of operation included three phases:

1. The crossing, executed by the rifle battalion.
2. An attack by one armored regiment to seize an assembly area for the general attack.
3. An attack by two armored regiments, operating alongside each other.

The fire preparation, air bombing, crossing and seizure of the bridgehead took place exactly according to plan, and almost without losses. The effect of the fire from the flame throwers, the artillery and aviation, was so great that the enemy was positively paralyzed, and at the time of crossing offered practically no resistance.

The crossing began at 10:30 a.m., and by 1:15 p.m. the bridge was ready and the armored squadron crossed over. The construction of this bridge represented an unusual accomplishment since in 55 minutes time a 50-foot bridge with a capacity of 40 tons was built under fire. The enemy twice attempted counterattacks with infantry which were repulsed. In another unsuccessful counterattack, the resistance of the enemy was completely broken and a total of 380 prisoners, including the commander of the battalion, were taken.

Our own losses were seven killed and 14 wounded.

The 1st Armored Regiment set out at 4 p.m., crossed the bridgehead and engaged the enemy. The antitank guns were brought into action and the attack of this regiment became a slow methodical fire fight as the enemy moved on to the north. During the night the engineers constructed a crossing of the Dever.

Battle for Aschendorf

The 1st Armored Regiment resumed the attack on April 20, and at midday headed in the direction of Aschendorf. The terrain was suitable for tanks, and squadrons were able to deploy. Movement was not easy, however, owing to increased antitank defense. The fighting became a typical tank battle, with the adversary well equipped with antitank guns and artillery which were delivering an incessant and fairly dense fire from somewhere in the area northeast of Aschendorf. The air force, however, eliminated the artillery.

The "Konstanty" formation (24th Uhlan Regiment with other detachments) operating alongside the 1st Armored Regiment, encountered only weak resistance, but bad terrain slowed the rate of advance. The boggy roads gave way under the weight of the tanks. The columns were broken up, and two or three enemy antitank guns completely paralyzed movement. About noon, however, the canal was reached and two crossings suitable for use by tanks were seized.

Meanwhile, the action of the left wing was developing very well. At 11:30 a.m. the attack on Aschendorf began, and at 1:30 p.m. the 1st Armored Regiment reached a point even with the city. About this time, the "Konstanty" group arrived and engaged the enemy on the highway. This action cancelled the plans of the enemy to withdraw to the northeast under the protection of his antitank guns. The "Konstanty" group advanced, reached the Aschendorf-Papenburg highway and seized the undamaged crossing over the canal, almost within the suburbs of Papenburg.

This action sealed the fate of Papenburg which the enemy was now unable to defend, and the following day he surrendered the city almost without fighting.

The 1st Armored Regiment continued the battle of Aschendorf under difficult conditions. The city was on fire, and the enemy's routes of retreat having been cut, he now defended himself in the buildings. But resistance was gradually liquidated, and the regiment moved on to the final phase of action assigned for that day, the capture of the Tunxdorf woods in the bend of the Ems river northwest of Aschendorf. This action aimed at securing the left flank of the brigade for action against Papenburg the following day.

By evening of April 20, it was plain that the brigade had completed its mission. The Küsten canal, as an obstacle, had lost its value over its entire length and the forces fighting to the right of the brigade now needed only to construct a bridge and then cross over for further action in the Frisian Peninsula.

The entire operation, including the crossing of the canal and the capture of Aschendorf, was carried out in accordance with plans and with efficient cooperation between the armored brigade and supporting weapons.

Among the more important features of this action were the following:

1. Attempts at crossing by brute force did not succeed, but further preparation in the form of special reconnaissance and careful elaboration of the plan of operation gave positive results.

2. The artillery and air preparation lasted scarcely twenty minutes, but was so concentrated that the defenders were stunned and knocked out of the battle for the time required to cross the canal and establish the bridgehead.

3. The air force played a very important role. The bombings at the time of the fire preparation were executed with precision and extreme accuracy, very close to our own forces. The air effort on the first day was 145 sorties and on the following 70.

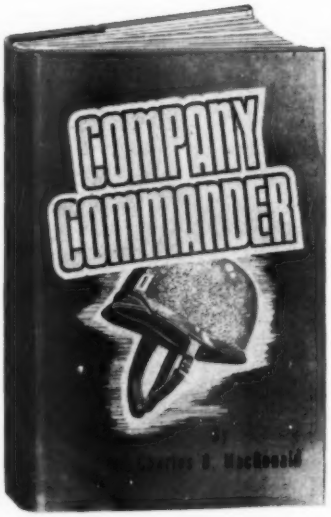
4. The "Crocodile" flame throwers rendered enormous service, both during the crossing and the tank attack. They were perfectly adapted for "smoking out"

the enemy from his positions in buildings, and in shrub-covered terrain, also when dug-in or hidden in shelters.

5. The correctness of the principle of "fire terror," which our armored formations had adopted from experiences during the previous year, was confirmed. This consisted of fire from all armored vehicles, delivered on everything in the terrain that might be the hiding place of some enemy weapons, whether confirmed or only possible.

6. One group operated in bad terrain where advance was possible only over roads which could bear the weight of a tank in spite of hard surface. Thus, the enemy with demolitions was able to check the speed, shock and maneuverability of our tanks.

7. Placing a combat group under the command of the assistant commander creates certain staff difficulties. The commander of the formation must be given means of command. A staff must be created for him similar to the staff of the brigade.



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THE LIPPIZANERS*

Royal Horses of Austria

by H. H. Douglas

CONCLUSION

FROM the preceding instalment of "The Lippizaners" it is clear that when, in 1580, Archduke Karl set out to establish a superior breed of horses he picked his principal stock from the three most superior breeds then in existence—the Andalusians, the Italians, and the highly esteemed and world famous Arabs. Some Danish and Kladrub stock was also introduced, but the three just mentioned have always exerted the preeminent influence, with the Arabs responsible for establishing the dominant white. In addition to the bays, browns, blacks and grays mentioned earlier there have been Lippizans of a light yellow color, as well as white horses with rather large black spots. There is no albino strain, the skin, nose and hoofs being black. The horses bred from these strains form a speedy, elegant, tough and durable type with dry, well-formed bones and well-rounded bodies, though, depending upon the predominant blood of the particular mixture, the figures of the horses may vary. As quick and durable riding horses they are unexcelled, but there is little evidence that they have been used extensively as cavalry horses.

The horses of Lippiza were extremely beautiful and well built, and surely the Royal Stables at Vienna needed beautiful carriage and riding horses, the latter especially for their luxurious riding ceremonies. Therefore the breeding in Lippiza was given special attention, and the whole stable built up by the most rigid standards.

It is hardly possible in an article of this kind to give any sort of an adequate idea of the beauty and remarkable qualities of the horses of the pure Lippizan strains bred with such loving care for more than 350 years. Milk-white at maturity, they have a strong, proud head, with deep, dark eyes, velvety nostrils, an unusually short and regularly formed throat, gracefully curved neck, white mane and tail, broad, beautiful breast, back relatively long, the flanks well closed, and light, powerful legs which make the grace and rhythm of their movements, whether at play or at work, as natural as their breathing.

Their intelligence and understanding is remarkable, and once their training begins it seems almost as though they already know just what to do, needing but the gentle commands and signals of the rider or driver to bring forth a perfect performance. The instinct to obey, to submit themselves to the will of man, seems to have been a part of the Lippiza breeding. A rider or driver invariably holds a whip, but never uses it except for the gentlest of signals.

Among early stallions used at Lippiza we find the following mentioned: *Cordova* (1701); *Lipp* (1717), a white horse from the stud of Lippe-Bückeburg; *Pluto* (1772), original Danish white horse from the old Fredericksborg Stud; *Conversano* (1774), original Neapolitan black horse; *Favory* (1779), dun horse from the Imperial Kladrub Stud; *Maestoso* (1773), white, from the Kladrub Stud; and *Neapolitano* (1790), original white Neapolitan. Besides these horses, there were also a number of original Arab stallions, some bred purely, and some crossed with Karst mares. Especially eminent among the Arabs was the white horse *Siglavy* (1816), because he formed with Karst mares what is still a highly respected stem. This original Arab was taken as booty by Field Marshal Prince von Schwarzenberg after the Battle of Leipzig and sold to the Lippiza Stud.

Since it was felt that an insufficient amount of Arab blood had been used not only at Lippiza, but in the other Austrian and Hungarian studs, in the year 1856(?), by order of the Emperor, a great expedition to the Orient was undertaken under the leadership of Colonel Rudolf Ritter von Brudermann to buy original breeding horses. In Syria, Palestine and the Bedouin deserts 16 stallions and 18 mares were bought. After an absence of ten months the mission arrived in Trieste June 22, 1857(?), with an addition of 14 foals. The

The Horse, September-October, 1947.

following day the horses were unloaded from the boat and taken to Lippiza and Prestranek. In the Lippiza Stud the two stallions, *Samson* and *Hadedi,* remained, along with 16 mares and one colt. The remainder of the shipment went to the stud at Bábolna, Hungary, over which Colonel von Brudermann was simultaneously placed in charge.

With these horses, and with the original Arab stallions, *Gazlan* and *Saydan,* brought to Lippiza a few years earlier, Arab full-blood breeding was undertaken, producing good, beautiful and noble animals. But in the heavy carriage service in Vienna these fine Arab horses could not compare with the robust Karst race. For this reason the full-blood breeding was given up. The Arab stallions were then used only for crossing with Karst mares, and here the Arab blood proved itself. Since 1870 only Karst or Arab stallions have been used.

The six stallion stems mentioned earlier are still bred at the present time—*Pluto, Conversano, Favory, Neapolitano* and *Maestoso,* with the successors of the original Arab *Siglavy* being used for the crossings. The Pluto stem, with no mixture of Arab blood, is the most robust of the Karst horses. All the other stems are more or less mixed with Arab blood—the *Conversanos* and *Maestosos* with *Siglavy;* the Neapolitans with *Gazlan,* and the *Favorys* with *Ganaghi* and *Gazlan.*

The year 1580 marked the beginning of what came to be the illustrious Lippizaner breed which eventually came to exert such a strong influence in the horse breeding of that part of the world, and which came to be the most preferred horses at the Austrian Court in Vienna. So distinctive and remarkable did they become that when the Spanish Riding School (so-called because the original Lippiza horses came from Spain), begun in 1729 as a wing of the Hapsburg Palace, and completed in 1735, was opened, none but Lippizaners were ever ridden there, and they quickly came to be a symbol of the pomp and circumstance of royalty.

It is sometimes stated that the Spanish Riding School got its name because of the Spanish style equitation practiced there. This version can hardly be true since Antonius de Pluvinel de la Baume (1555-1620), Europe's most finished horseman and riding master of the French Duke of Anjou (Henry III) early in the 17th century, received his training and early experience in Italy. Later, in the reign of Henry IV, he founded a riding academy near Paris for the training of royal horsemen. It was in Italy that he secured the background and experience which enabled him to prepare erudite and voluminous works on the art and science of fancy equitation—*"Maneige royal."* Paris, 1623. A grand folio with 66 plates; *"L'instruction du roy, en l'exercise de monter à cheval. . . ."* Paris, M. Rvette, 1625 and 1629; and *"L'exercise de monter à cheval, ensemble le maneige royal. . . ."* Paris, Chez E. Loyson, 1660. The latter also bears the name of René de Menou, Sieur de Charnizay, who edited and arranged for the publication of the earlier editions.

It is not unlikely that Pluvinel originated the idea of establishing the Riding Academy "for the training of imperial, royal and aristocratic horsemen for martial and private purposes," but it was not until over a hundred years later that the idea actually took shape. There seems to be no indication that William Cavendish, Duke of Newcastle (1592-1676), had any part in originating the idea of the Riding School, but his books, together with those of Pluvinel, under whom he studied as a youth, were basic works in the development of the Vienna Academy. It seems hardly a coincidence that a second edition of one of his books, a handsome highly illustrated folio—*"Methode et invention nouvelle de dresser les chevaux"*—was published in 1737 just two years after the opening of the Reitschule. His first volume was published in French in Anvers (Antwerp) in 1658; the second was in English and published in London in 1667, later (1671) to be translated and published in France, where it was considered a classic. The title of the English edition is *"A new method and extraordinary invention to dress horses, and work them according to nature; as also to perfect nature by the subtlety of art; which was never found out but by the thrice noble, high, and puissant Prince, William Cavendish . . . etc."*

The Riding Academy has remained essentially unchanged since the court architect, J. Fischer von Ehrlach the younger, saw the building to completion in 1735, though it underwent some alteration in 1850. The Reitschule became at once one of the show places of Vienna, and royal visitors were always honored with a riding demonstration. Theodore Roosevelt was also so honored by Emperor Franz Joseph. The Riding School was a familiar place to Schubert, and to Johann and Oscar Strauss where some of their music was first introduced. At one time Franz Lehar was leader of the band. Music is an inseparable part of every performance. The horses not only have an incredible sense of rhythm, going through the equine ballet with perfect grace and timing, but they seem to enjoy the music as much as humans. They have a peculiar grace in all their actions, emphasized when trotting or running, by which they seem to be beating time to an inner music of their own.

The Lippizaners, in common with other white breeds, are born black. In their second year they turn gray, in their third silver, and at the end of their fourth year they are nearly always pure white. It was when they were four that the chosen ones went to the Riding School. The others became riding or coach horses for the Imperial Household. The Lippiza Stud also furnished white or gray post horses for the Royal stables. These horses, though elegant and very speedy for general usage and endurance were not bred very high at Lippiza, being chosen from the breeding of Arab stallions with heavy Kladruber mares.

The Lippizaners have traditionally been branded with a small L on the left jaw, and during the reign of Franz Joseph they were also marked with a small FJ on the chest. The Lippizaners mature slowly, normally

taking about seven years, but remain in service a correspondingly longer time. It is not unusual for a horse of 25 years to be able to perform the strenuous routines of the Riding School, and the Pepinier stallion *Maestoso-Bresovica,* who was retired shortly after World War I, in his last year of service successfully bred fifty per cent of the mares covered by him.

World War I not only saw the end of the Hapsburg Monarchy and the eclipse of the Riding School, but it resulted in the ceding of the Istrian Peninsula to Italy. A part of the horses also went to Italy. These were taken to the island of Sardinia where, within a relatively short time, they all perished of a virulent breast disease. Those remaining in Austrian hands were moved to Piber (established in 1798 under Joseph II). Some figures give the number transferred as low as 3 stallions and 38 mares. Whatever the figure may have been there were, in 1936, according to Prof. J. W. Amschler of Vienna, 22 stallions and 53 mares of all ages at Piber. (In 1868 Piber housed 91 Lippizan stallions.)

When they were moved from Lippiza, deeply concerned about the future of the breed, Count Franz Esterhazy bought some of the most prized of the Lippizan carriage horses. He wanted to see the breed perpetuated and dedicated the three best pair of each generation to the Hapsburg who would some day, he was certain, return to rule over Austria and Hungary. For many years a bit of the glory of the Vienna Riding School was to be seen at his estate at Tatatovaras, a short distance west of Budapest. He also held annual sales there..

Not long after the end of World War I the Vienna Riding School reopened and in the latter part of the 1920s was listed by Baedeker as one of the tourist attractions of Vienna. It continued to function, though not without difficulty, until the German Anschluss in March 1938.

A few months after the conquest of Austria the German army sent a delegation of officers to Piber to determine what might be done with the Lippizaners. Nothing, apparently, was done until 1943, when they moved them all to an army breeding institute at Hostau, a short distance southwest of Pilsen in Czechoslovakia.

The 2d Mechanized Cavalry Regiment of American Third Army seized Hostau on April 28, 1945, finding there about 247 Austrian Lippizaners, including a few which may have come from Yugoslavia. The words of then Capt. Thomas M. Stewart, son of Senator Thomas Stewart of Tennessee, in a letter to the writer dated May 12, 1947, best describe the events immediately preceding the seizure.

"On about the 26th of April 1945 a German veterinary surgeon, Capt. Rudolf Lessing, entered our lines with the information that the Austrian Lippizaner herd and some valuable Arabs, Kabardiners, Dons and Thoroughbreds were located at Hostau. (How the original contacts were maneuvered is still a military secret.)

"Colonel Charles H. Reed, my commanding officer, sent me to determine the presence of the horses and the strength of the enemy defenses. With Lessing as guide I evaded the German outposts during the night and went to a small village across the Czech border where his servant waited with horses for the remainder of the trip. I rode a black Lippizaner stallion. This horse and one dark brown mare were the only horses in the herd that were not uniformly white in color. I found him a spirited and remarkably intelligent animal, responding as if he had always been accustomed to carrying me. I also jumped him across a small abatis about three feet high and five feet wide before the shocked Lessing caught up and informed me that the Lippizaner was not a jumping horse.

"In Hostau I made arrangements for the surrender of the Depot, and returned in the same manner to my outfit. We easily broke through the German lines, and Colonel Reed left me with a reinforced Cavalry troop to occupy Hostau.

"About ten days after V-E Day (May 8) I moved the Lippizaners, Arabs, and some of the Thoroughbreds, about four hundred horses in all, across the Bavarian border to the vicinity of Cham (south of Hostau). This was a day's trek through the country for all except mares with very young foals, which were trucked. From Cham 14 mares (including *Madera* and *Saffa*) with 6 foals, and the stallions *Siglavy-Virtuosa* and *Neapolitano-Slavonia I,* were shipped to Mansbach (a short distance southwest of Eisenach), Germany, for possible shipment to the United States.

"During the last week in May we moved the Lippizaners by truck to Austria, where they were turned over to General William Collier, Commander of the 20th Corps, and to Colonel Podhajsky, of the Riding School of Vienna, near Wels, between Linz and Lambach.

"In all there were about 88 mares with 60 foals, and 7 stallions of the Spanish Riding School (Hauptbeschäler, they were called). Of the other stallions there were 10 three-year olds, 8 two-year olds, and 24 yearlings. The fillies: 8 three-year olds, 17 two-year olds, and 14 yearlings, 235 altogether were delivered to Austria."

Capt. Stewart has also said that the black stallion he rode came from King Peter's Yugoslavian Stud. The brown mare he mentions may have also come from Yugoslavia.

Piber, the prewar home of the Lippizaners, is in the British Zone, and Vienna, itself segmented, is in the heart of the Soviet Zone. Professor Johann W. Amschler, associated with the Riding School since about 1935, and professor of breeding at the Vienna Hochschule für Bodenkultur, is the principal breeding advisor for the Lippizan Stud.

At the time of the restoration ceremonies General Patton himself rode the Lippizan that had been selected by Hitler to be presented to Emperor Hirohito of Japan. Patton did better than Halsey.

Austria will continue to breed the regal Lippizaners, not out of nostalgia for the past, but as a valued and cherished part of their national culture and heritage.

Armored Division Associations

11th Armored Division

Response to the 1948 dues post card and Newsletter has brought us gratifying results—but there are still a lot of members from whom we have heard nothing.

Requests have been sent to all the local chapters for news of their meetings but we haven't as yet received much news from them. We realize there is quite a bit of work in organizing chapters and we know after they get running smoothly, we will have news in each issue of the JOURNAL.

At the New York Chapter meeting on October 3, the following members were elected: Arthur Shapiro, president, Robert D. Millar, vice president, Russel V. Bancker, secretary, William Reap, assistant secretary, and Oliver Johnson, treasurer. George D. Halprin, president of the Association, was unanimously elected honorary president of that chapter. Incidentally, congratulations are in order for the Halprins, who became the proud parents of a baby boy named Albert Philip, born October 18.

Plans for the convention were discussed and tentative dates of August 12, 13, and 14 were set. The Hotel Commodore was announced as probable headquarters for the event. We will have full details for you later on as to the prices of rooms, deadline for reservations, etc.

John Healy of the Minnesota Chapter plans for a meeting of that chapter for the latter part of November.

A Detroit Chapter should be formed soon. Several fellows are interested in organizing that territory and they should get together within the next couple of weeks.

General "Ted" Brooks assumed command of the Antilles Department September 15th.

"Pete" Kilburn is working on a radio program for the west coast listeners—we don't know just when he makes his "debut" on the air, but here's wishing him luck.

Clark E. Bennett (56 Eng) of Endicott, N. Y. thanks us for helping him to get his Bronze Star Medal.

Major "Mike" Greene (41 Cav) at Fort Knox tells of a get-together at Colonel Robbins' quarters. Lieutenant Colonel Joe Ahee, Chaplain Kinsler, Major Cunningham, Major Siemers, Lieutenant Colonel Brady, and Major Ralph Gray with their wives were among those present.

Lieutenant Colonel Raymond Lumry ordered 8 copies of the History—five to be given to families of members killed in his battalion. He is now with an Amphibious Training Unit in Coronado, Calif.

Edward J. Martin of the American Disabled Veterans in Boston, offers assistance though facilities of his office for members of the association residing in New England. John M. Gaskell (55 AIB), Newtonville was in Washington and obtained addresses of some buddies. Robert Shickert (55 AIB), Pittsburgh, Pa. also paid us a visit and gave us some names of the 55 AIB. Miles Butler and Franklin Eaton also sent lists.

Lewis Conine (151 Sig) hopes to get a Philadelphia chapter going. Clarence (Eastern Airlines) Torrey of Chicago visited him in Philly recently. Don Casanova (Trns) is now singing in a night spot in Miami, Florida.

Homer B. Walker (A Btry. 490 AFA), 1208 Seventh Ave. Charleston, W. Va. wants to hear from his buddies in that outfit. He was shipped back to the U.S. after being wounded in action and has lost track of them.

F. Rod Smith (56 Eng) of Rochester, N. Y. writes that he enjoyed reading about the convention and will break his neck to meet with the old gang in New York next year.

Our thanks to the new subscribers as well as those who have been taking the JOURNAL for some time. We want all the news you believe would be interesting to other members. This column is published for your interest—so send us some news for the next issue of the JOURNAL. It should be in our hands by December 15th.

* * *

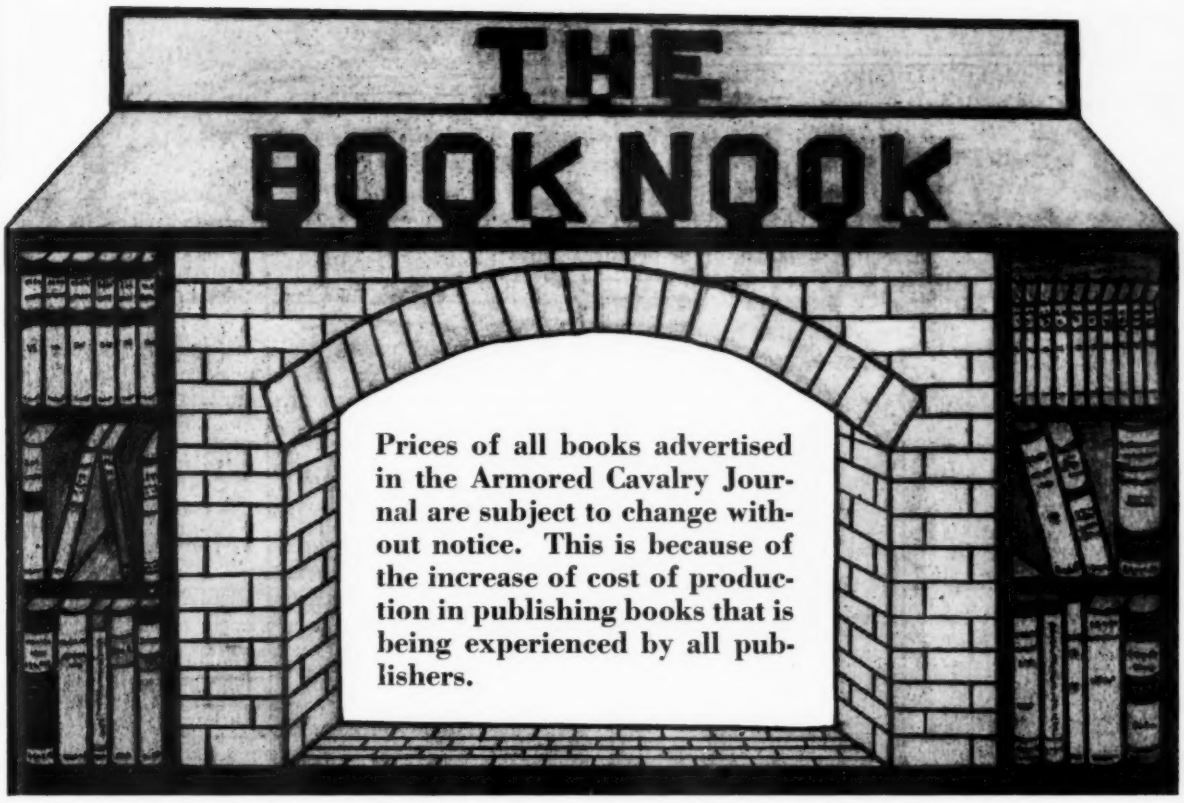
12th Armored Division

Approximately 1,000 former combat veterans of the 12th Armored "Hellcat" Division, hailing from all sections of the country, met on September 13-14 at the Hotel Commodore, New York, for their first reunion since inactivation of the Association at Heidenheim, Germany, in September, 1945.

Main points of the convention were the election of a new executive council and Association officers for the year 1947-48. Jean Norton of Beaver, West Virginia, was elected president, with William R. Comfort of Cleveland, Ohio, as vice president. During the regular business session it was decided that the second annual convention would be held in Chicago, during September, 1948. The exact dates in September will be announced later. Following the business meeting all members and their wives were entertained at a dance and cocktail party given by the Association.

An elaborate banquet held at the Hotel Astor on the last evening of the convention was the highlight of the reunion. Lieutenant General Raymond McLain, Chief Liaison Officer of the Department of the Army to veterans' organizations, was the guest speaker of the evening. Following General McLain's address, guests were entertained with a two-hour floor show.

All former members of the Division interested in joining the Association are invited to contact the Association Secretary, C. P. Chapman, at 815 Rosedale Avenue, Bellefonte, Wilmington, Delaware.


THE
BOOK NOOK
Prices of all books advertised in the Armored Cavalry Journal are subject to change without notice. This is because of the increase of cost of production in publishing books that is being experienced by all publishers.

LUCKY FORWARD. By Colonel Robert S. Allen. The Vanguard Press, Inc. $5.00.

It is quite evident in this book that General George S. Patton, Jr., is the hero and idol of author Colonel Robert S. Allen. Never has a more favorable book been written about a general and his army than *Lucky Forward*, the story of Patton's Third U.S. Army.

This is another one of those adolescent books on World War II reminding one of the little boy who screams, "My daddy can lick your daddy," etc.

If General Patton was ever wrong or if he made any mistakes during his command of the Third Army, the author of *Lucky Forward* has failed to mention them. General Patton, according to Colonel Allen, fought a faultless war against the blunderings of other American and British commanders, especially General Eisenhower and Field Marshal Montgomery.

On page 25 the author states, "It is not an exaggeration to state that Patton fought two wars in the ETO; one against the enemy and one against higher authorities for the opportunity to fight the enemy."

Throughout the book Colonel Allen displays his passionate hate of rear area service units. Although these units did their share in helping win World War II, Colonel Allen certainly gives them no credit. According to him they spent most of their time hindering the battle efforts of the Third Army.

Whatever may have been the underlying motive of the author in writing this book is not known. It certainly has added little, if anything, to the factual history of the war, and furthermore the deeds of a successful general stand alone without adolescent ramblings printed in book form for which the purchaser pays five dollars.

Sorry, but in fairness to the intelligence of our readers, this book cannot be recommended as good reading.

* * *

I REMEMBER DISTINCTLY. Assembled by Agnes Rogers With Running Comment by Frederick Lewis Allen. Harper and Brothers. $5.00.

This book contains 500 of the most candid pictures in existence and 37,000 words of running commentary on the everyday life and dramatic events, the scandals and the heroics, the hijinks and the tragedies, the hopes and fears of the whole wonderful era between World War I and World War II.

Designed primarily for entertainment, this book is a valuable addition to anyone's library. It brings back memories of some of the greatest times in American history. There are pictures of Babe Ruth in his baseball heyday, the Hall-Mills case, the Bank Holiday, the Lindbergh kidnapping, the Hollywood idols, and hundreds more. Every picture brings back a memory to the reader.

* * *

COMPANY COMMANDER. By Charles B. MacDonald. The Infantry Journal Press. $3.00.

Charles B. MacDonald came to the 2nd Infantry Division as a replacement company commander in September, 1944—and stayed with an infantry company (with time out for a wound and evacuation) for the rest of the war. *Company Commander* is his story—and by the time you've finished it, the men of Company I and Company G will be your friends, and winter warfare an old experience of your own.

WAR AS I KNEW IT

By GENERAL GEORGE S. PATTON, JR.

$3.75

Contained in this book are the rules and principles forged from General Patton's fighting experience in three wars, principles which constantly illuminate his thoughts and actions. It is the book that all students and believers in General Patton and his Third Army have been waiting for. Most of the book has been written from the diary that General Patton kept from July, 1942, until December 5, 1945, four days before his fatal accident.

Order Your Copy Today

War As I Knew It includes an account of the Third Army's campaign that is prefaced by a group of open letters from North Africa and Sicily, letters about the non-military aspects of Operation "Torch" and Operation "Husky" and is followed by two chapters in more personal vein. "Reflections and Suggestions" is the distillation of the General's military philosophy, and the last chapter, "Earning My Pay," is an account of the tight spots in his long military career.

This Book Will Make A Splendid Christmas Gift

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This is one of the outstanding books so far written on combat experiences of the past war. It is a book to be read by soldier and civilian alike.

In his preface, MacDonald says of his book, "The characters in this book are not pretty characters. They are not even heroic, if lack of fear is a requisite for heroism. They are cold, dirty, rough, frightened, miserable characters; GIs, Johnny Doughboys, dogfaces, footsloggers, poor bloody infantry, or as they like to call themselves, combat infantrymen. But they win wars." And, as the author says, it really is their story.

No better book on the soldier in the front lines has yet been written than *Company Commander*.

It is highly recommended reading.

✦ ✦ ✦

ADVERSARY IN THE HOUSE. By Irving Stone. Doubleday & Company, Inc. $3.00.

Based on the life of Eugene V. Debs, this novel is a blazing story of love and devotion.

The book tells of the many years that Eugene Debs fought not only man's inhumanity to man, but also the adversary in his own house, an adversary to whom he was completely devoted.

Eugene Debs was driven by an overpowering dedication to the cause of the workingman, a dedication stronger even than love. It prevented him from marrying Gloria, the woman he loved. Years later he married a striking and determined woman named Kate Metzel.

To the very end, through Debs's public trial and the shame of his imprisonment in Atlanta penitentiary, Gloria's love never wavered, Kate's opposition never diminished.

✦ ✦ ✦

PERSONAL RESEARCH AND TEST DEVELOPMENT IN THE BUREAU OF NAVAL PERSONNEL. By the Staff, Test and Research Section in Cooperation with N.D.R.C. Edited by Lieutenant Commander Dewey B. Stuit. Princeton University Press. $7.50.

This book is an evaluative summary of the research in selection, classification, and training of personnel conducted by the U.S. Navy's Bureau of Personnel. As a case history of the application of modern technique to complex personnel problems, this study will be useful to psychologists in military organizations, educational institutions, public personnel administration, business, and industry.

The book is a detailed account of the experience of one personnel research organization with the use of some distinctly new and other established techniques to the varied problems of military selection, classification, and training.

✦ ✦ ✦

AMERICA AND WAR. By Colonel Marion D. French. The Military Service Publishing Company. $5.00.

Here is an important military history that interrelates the history of the United States with the history of its armed forces.

Throughout his absorbing account of America and War, Colonel French carefully weighs, balances and analyzes the perpetual pull-and-push between conflicting influences; the social against the economic, the liberal against the conservative, the political against the military, the isolationist

against the expansionist; and interprets the effect these struggles have had on America's history.

By drawing a combined picture of the significant influences on American history—never forgetting the very important military and naval aspects which practically all general historians have ignored—Colonel French has for the first time set the whole historical scene in perspective. Minor, and generally forgotten, events are shown in their true relation to the whole scene of American history.

✦ ✦ ✦

NOW HEAR THIS! By John J. Motley and Philip R. Kelly. The Infantry Journal Press. $4.00.

In this book the authors have tried, according to their Foreword, to pull together in a narrative form the chronological actions of representative ships of every type in the U. S. Navy. Included in the book are the fighting records of many great American naval ships, both large and small.

✦ ✦ ✦

STRATEGY IN WORLD WAR II. A Strategical Examination of the Land Operations. By Lieutenant Colonel Alfred H. Burne, British Army Retired. The Military Service Publishing Company. $1.75.

After pointing out that the advent of the Atomic Bomb has not necessarily changed the aspect of war, Colonel Burne deals with land strategy so far as the subject can be isolated. This book should be in the library of every student of military strategy.

✦ ✦ ✦

PRIZE STORIES OF 1947. The O. Henry Awards. Edited by Herschel Brickell. Doubleday & Company. $3.00.

This is the twenty-ninth annual volume of the best of American short-story writing. Mr. Brickell has written an introduction appraising the short-story scene and the prize winners.

✦ ✦ ✦

THE GREAT TIDE. By Rubylea Hall. Duell, Sloan & Pearce, Inc. $3.50.

The Great Tide tells the story of a boomtown Gulf port, of plantation life on Florida's fabulous West Coast in the 1830's and '40's, and of a tempestuous, unforgettable woman, Miss Carolina Cohran. The story sweeps across 10 adventurous, tragic years of Caline's life in the exciting, flamboyant, doomed city of St. Joseph, and later at magnolia-scented Greenwood plantation.

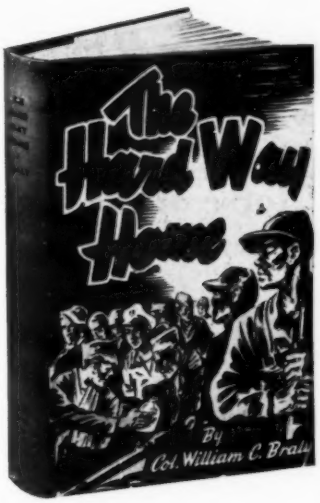
✦ ✦ ✦

OPERATION VICTORY. By Major General Sir Frederick Francis de Guignand. Charles Scribner's Sons. $3.75.

The Chief of Staff to Field Marshal Montgomery has written an important historical book on World War II.

General de Guignand begins his story in 1937 when he was a major entering upon his first staff assignment with the British Army. An outline of the operations of World War II in which he had a hand, de Guignand devotes much of his book to the staff work that went on, the planning and coordinating measures necessary to the efficient conduct of war.

EVERY AMERICAN SHOULD READ



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By Colonel William C. Braly

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What happens when an officer of the United States Army, a man who has spent his life in the service, and is known and respected from Corregidor to Fort Williams, Maine, is told he is lower than the lowest Japanese private? How can he keep his self-respect when he is slapped, with or without provocation, by any stray Jap soldiers who happen to pass by? How can he keep his sense of humor when he is shivering in rags, underfed, overworked?

Colonel William C. Braly answers these questions—and poses many more. In *The Hard Way Home* he tells of the privates and noncoms who inflicted suffering on Americans in contravention of all the rules of warfare. He brings home the fact that the Japs responsible for brutality were the "Japanese people" that are being forgiven for their sins today.

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By ROBERT MOORMAN DENHARDT

$5.00

The Horse of the Desert

By W. R. BROWN

$10.00

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The Horse of the Americas gives the first comprehensive account of the arrival, spread, and development of the Spanish horse in the New World. In addition to the historical account, Mr. Denhardt discusses breeds, types, strains, and colors. Appended is material on the evolution of the Western saddle, brands, the rodeo, and the American Quarter running horse.

The Horse of the Desert, written by America's greatest authority on the subject, is the only book on the Arabian horse now in print. It contains: an extensive list of the principal Arabian tribes, sub-tribes, and clans; the most complete and authoritative list of the strains and families of the Arabian horse; the largest bibliography on the subject; a map showing the regions most suitable for breeding horses in the United States, and the Arabian ancestry of most of the present-day breeds.

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WEST POINT. By John Crane and James F. Kieley. Whittlesey House. $6.00.

In a colorful, descriptive text and 600 beautiful photographs (4 in full color) is caught the essence of life at the United States Military Academy—the classes, the dress parades, the physical training, the colorful history and traditions. The perfect book for past and future graduates of West Point. Foreword to the book is written by President Truman.

✦ ✦ ✦

THE 91ST INFANTRY IN WORLD WAR II. By Major Robert A. Robbins. The Infantry Journal Press. $5.00.

This book includes a short history of the 91st Infantry Division in World War I as well as the story of its training and combat service in World War II from activation on August 15, 1942, at Camp White, Oregon, to inactivation on December 1, 1945, at Camp Rucker, Alabama.

✦ ✦ ✦

WHERE I STAND. By Harold E. Stassen. Doubleday & Company, Inc.

In this book Mr. Stassen, announced 1948 presidential candidate, has set down the nucleus of his political beliefs against a background of personal experiences.

The book in 12 chapters covers: 1. Bayonets Vs. Pickets; 2. On the Other Foot; 3. The Russians and Our System; 4. Sergei of Sverdlovsk; 5. Communists in America; 6. The Fair Balance; 7. The Minnesota Labor Law; 8. Dynamic Capital; 9. Housing; 10. The Health of America; 11. Small Business; and 12. In Summation.

In his Foreword to the book, Mr. Stassen says, "I know of no way to advocate ideas without expressing them. I believe in the principles set forth in this book. I urge them upon my countrymen regardless of my political fortune or misfortune."

✦ ✦ ✦

WAR AS I KNEW IT. By General George S. Patton, Jr. Houghton Mifflin Company. $3.75.

Contained in this book are the rules and principles forged from the General's fighting experience in three wars, principles which constantly illuminate his thought and actions. It is the book that all students and believers in General Patton and his famous Third Army have been waiting for.

Most of the book has been written from the diary that General Patton kept from July, 1942, until December 5, 1945, four days before his fatal accident.

From his childhood, George Patton had one absorbing interest—the military art. His life culminated in history's greatest opportunity for the practice of this art. His memoirs have the interest which always is found when an intensely human expert writes of the field to which he has given the unswerving devotion of his life.

The account of the Third Army's campaign is prefaced by a group of open letters from North Africa and Sicily, letters about the non-military aspects of Operation "Torch" and Operation "Husky" and is followed by two chapters in more personal vein. "Reflections and Suggestions" is the distillation of the General's military philosophy, and the last chapter, "Earning My Pay," is an account of the tight spots in his long military career.

THE HORSE OF THE AMERICAS. By Robert Moorman Denhardt With a Foreword by J. Frank Dobie. The University of Oklahoma Press. $5.00.

Here is the first comprehensive account of the arrival, spread, and development of the Spanish horse in the New World. From the time that Columbus planted the seed stock in the West Indies, through the period of the Conquest of both North and South America, to the cow horse of the late nineteenth century and the modern Quarter Horse, Robert M. Denhardt has told the story of the Western mount.

In addition to the historical account, Mr. Denhardt discusses breeds, types, strains, and colors—Palominos, Appaloosas, Pintos, Albinos, and others of North America; *Costenas* and *Cholas* of Peru; *Criollos* of Argentina, Uruguay, and Brazil, and the *Caballo Chileno*. Appended is material on the evolution of the Western saddle, brands, the rodeo, and the American Quarter running horse. There are also lists of modern horse associations and a "family tree" of the four famous families of Quarter Horses.

* * *

THE HORSE OF THE DESERT. By W. R. Brown. The MacMillan Company. $10.00.

Written by America's greatest authority on the subject, it is the only book on the Arabian horse now in print.

It contains: an extensive list of the principal Arabian tribes, sub-tribes, and clans; the most complete and authoritative list of the strains and families of the Arabian horse; the largest bibliography on the subject; a map showing the regions most suitable for breeding horses in the United States, and the Arabian ancestry of most of the present-day breeds.

W. R. Brown, the author, was president of the Arabian Horse Club of America for many years, and a member of the United States Remount Council.

* * *

ADMIRAL HALSEY'S STORY. By Fleet Admiral William F. Halsey and Lieutenant Commander J. Bryan. McGraw-Hill Book Company, Inc. $4.00.

This is Admiral Halsey's own story of the war in the Pacific. It is the Admiral's own intimate report to the nation.

* * *

THE ORGANIZATION OF THE GROUND COMBAT FORCES. By Kent Roberts Greenfield, Robert R. Palmer, and Bell I. Wiley, of the Historical Section Army Ground Forces. Historical Division, Department of the Army. $3.65.

This volume is the first to be published in the series THE UNITED STATES ARMY IN WORLD WAR II, and the first in the sub-series THE ARMY GROUND FORCES. All the volumes will be closely related, and the series will present a comprehensive account of the activities of the Military Establishment during World War II.

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Here, at last is Admiral Halsey's own great story of the Pacific War. This human document is William F. Halsey's first intimate report to the nation. In it, he takes you from his plebe days at Annapolis—where he was not always a model midshipman—to the great moment when he made good his brag in Tokyo Bay. A completely candid book, you will find it one of the greatest true stories of life and fighting at sea in our times.

THE COMPLETE CARD PLAYER

By A. ALBERT OSTROW. Whittlesey House Publication. 771 *pages*, 6 x 9, *illustrated*, $3.75.

Here is everything to help you get more fun out of cards—by keeping the game "regular," according to the rules most of America's 83 million card players follow. The book gives full, modern directions and rules for 350 card games for players of all ages. All the best-known and standard games are here, plus scores of variations—games for children and beginners, games for various numbers of players, solitaires, etc.

ATOMICS FOR THE MILLIONS

By DR. MAXWELL LEIGH EIDINOFF and HYMAN RUCHLIS. 281 *pages*, 6 x 9, $3.50.

In a style stripped of scientific jargon, ATOMICS FOR THE MILLIONS traces the discovery of and developments in atomic energy from Greek theory, through the fact of fission, to a preview of the coming applications of radioactive materials to medicine and the second industrial revolution.

Liberally scattered through the pages are 110 simple and attractive drawings. These illustrations not only have a semi-humorous appeal, but also add to the clarity of the text.

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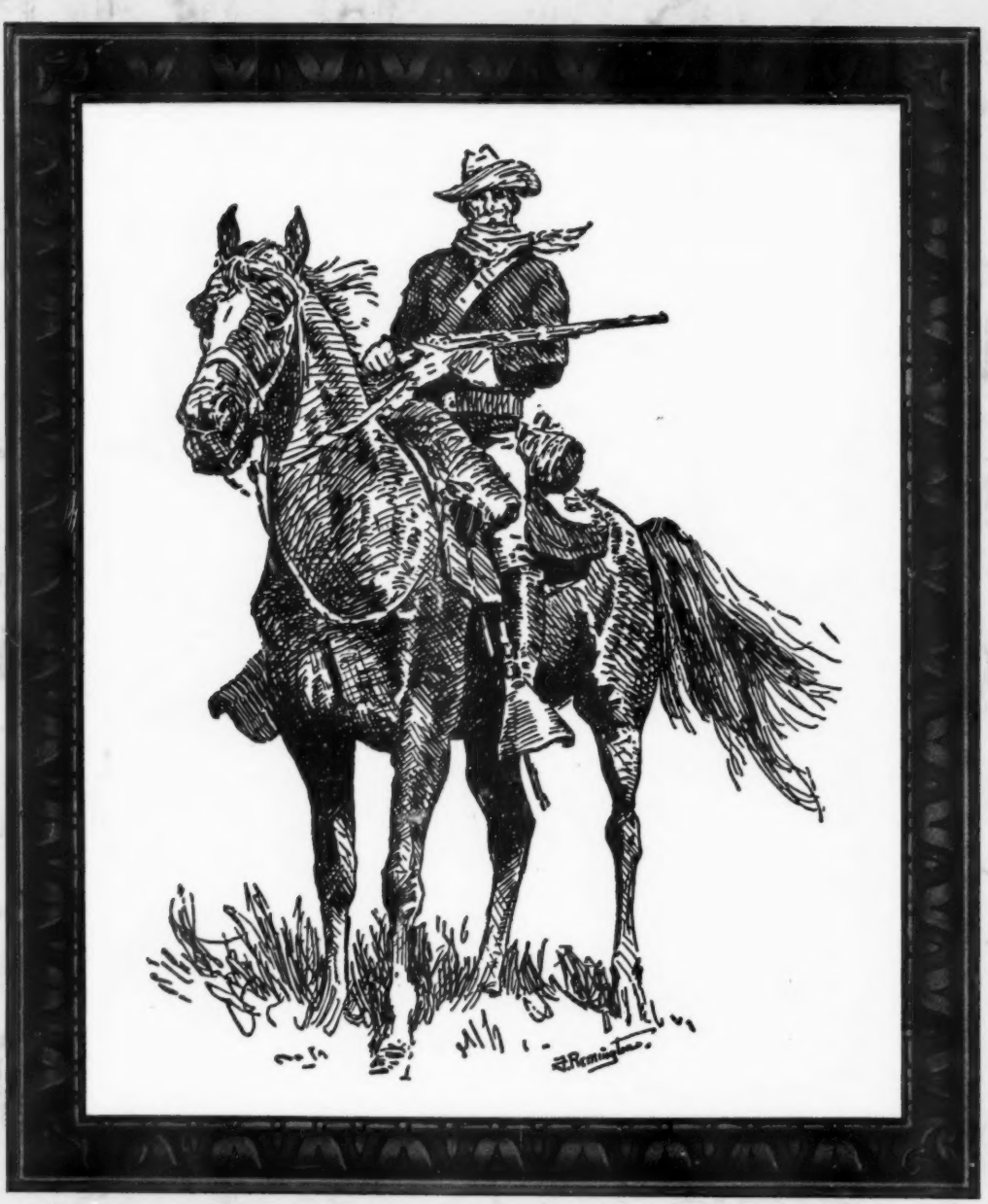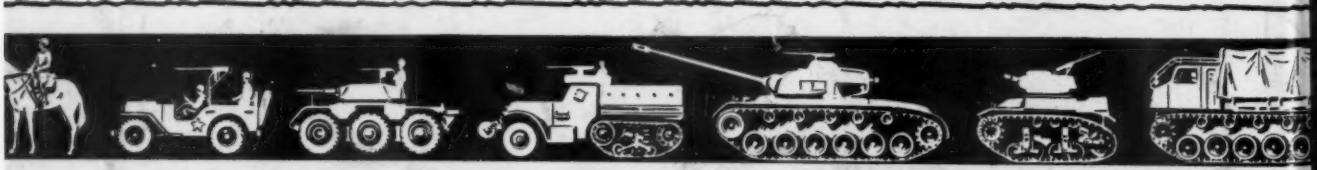
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